NINETY-NINTH YEAR

American Gas Journal

FEBRUARY, 1958 | Only Magazine Edited Exclusively for the Gas Distribution Industry

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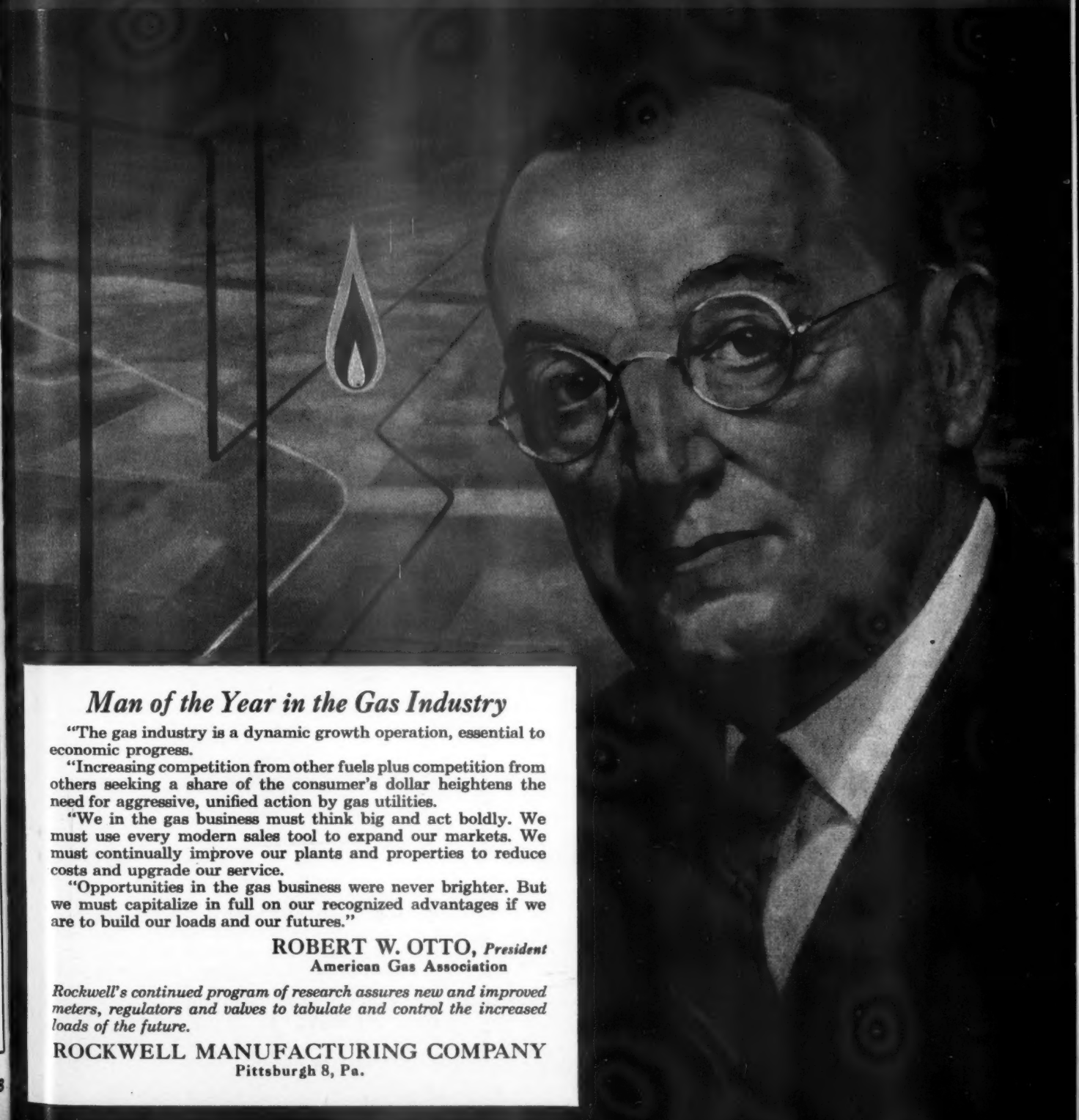


Man of the Year in the Gas Industry

"The gas industry is a dynamic growth operation, essential to economic progress.

"Increasing competition from other fuels plus competition from others seeking a share of the consumer's dollar heightens the need for aggressive, unified action by gas utilities.

"We in the gas business must think big and act boldly. We must use every modern sales tool to expand our markets. We must continually improve our plants and properties to reduce costs and upgrade our service.

"Opportunities in the gas business were never brighter. But we must capitalize in full on our recognized advantages if we are to build our loads and our futures."

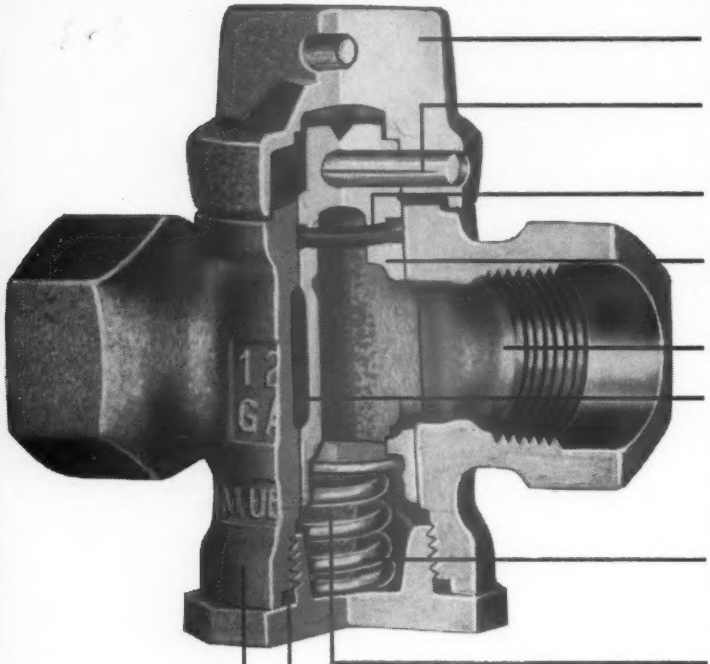
ROBERT W. OTTO, *President*
American Gas Association

Rockwell's continued program of research assures new and improved meters, regulators and valves to tabulate and control the increased loads of the future.

ROCKWELL MANUFACTURING COMPANY
Pittsburgh 8, Pa.

MUELLER®
inverted key gas curb stops

Gas-tight and easy turning without maintenance!



Large bronze cap protects ground key surfaces. Downward pressure on cap unseats key slightly for easy turning. Skirt on cap shears ice or other foreign material.

Shear-resistant silicon bronze drive pin solidly anchors cap to key.

"O" ring provides gas-tight double seal at top of key to prevent leakage—even when key is unseated while operating stop.

Heavy inverted bronze key is accurately machined and individually ground and lapped into the body to prevent leakage without lubrication.

Recessed thread ends add strength and corrosion resistance to pipe joints.

False ports in body and key line up with true key and body ports when stop is closed. This prevents grit or dust from sticking to the polished ground key seating surfaces and later damaging them.

Stainless steel spring seats the key and permits it to be unseated for easy turning. Gas pressure on the bottom of the key aids the spring and the seating pressure increases with the inlet pressure.

Compressible material inside of spring prevents breakage by absorbing the pressure created by condensed moisture freezing in the bottom of the stop.

Totally confined "O" ring provides a positive seal at the bottom of the stop and prevents leakage along the service line.

Heavy cast iron body of close-grained grey iron and base plug of malleable iron give maximum strength and resistance to corrosion.

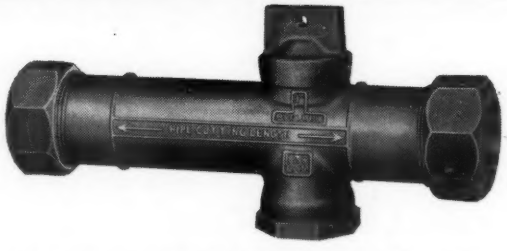
125 pound
Straight Way
Flat or Square Head
Black only
Sizes: ¾" through 2"

NO-BLO®

See Section 7 of your Mueller Gas Distribution Catalog G-97 for complete information on the full line of dependable Mueller gas curb stops. If you have misplaced your copy, or would like additional copies, write direct to:

MUELLER CO.
DECATUR, ILL.

Factories at: Decatur, Chattanooga, Los Angeles;
In Canada: Mueller, Limited, Sarnia, Ontario



Cutting-In Type Inverted Key Gas Curb Stop with Dresser Coupling Style 90 inlet and outlet. This stop permits cutting-in a curb stop in an existing line or to replace old inoperable or leaking curb stops.
Black Only
Sizes: ¾" through 2"

Established 1859

American Gas Journal ®

ONLY MAGAZINE EDITED EXCLUSIVELY FOR THE GAS DISTRIBUTION INDUSTRY

February, 1958 Vol. 185, No. 2

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The Index to Volume 184 (January-December, 1957, inclusive) of American Gas Journal is now available. Subscribers desiring a copy of this index may obtain one by writing on their company letterhead to Circulation Director, American Gas Journal, P. O. Box 1589, Dallas 21, Texas.

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HYDRAULIC CRANE

Saves time and manpower because it speeds up loading and unloading jobs... handles work normally requiring several specially-equipped vehicles.

Load-Master lifts a 4000 lb. load with ease... moves it safely and quickly under the most adverse job conditions. Power is derived from a heavy-duty hydraulic pump driven by the truck engine. Controls are located in a position which gives operator full view of the crane at all times.

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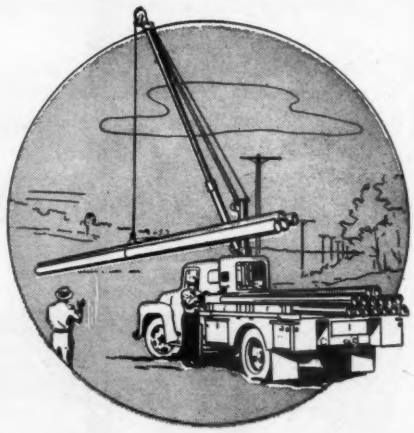

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Established July 1, 1859

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Fuel for Thought

TO PARAPHRASE A FAMILIAR QUOTATION, if the gas industry's three segments — distribution companies, transmission companies, and gas producers — don't stand together, then surely they will fall individually. The need for unity in the gas industry has never been greater. Unless, that is, the gas industry decides to go out of business.

In the short span of less than four years, the industry has witnessed two adverse court decisions. One, the *Phillips* case, is final . . . until and unless remedial legislation supported by all three segments of the gas industry is made into law.

The second decision, the recent *Memphis* case, is not final — but it would be unwise to assume that, even in the highest court, our modern judiciary might reverse this decision any more than it did in the *Phillips* case.

With unified action, the gas industry can overcome these obstacles. It will mean frank realization of the other fellow's problems. It will mean working together as a team to correct all injustices and seeking passage of remedial legislation that will accurately define regulatory procedures and clarify the present regulatory muddle.

The original purpose of the *Natural Gas Act* was to protect the public interest — not to destroy the gas industry. The mission of public utility regulatory agencies is to insure fair and equitable treatment to all parties — supplier and consumer. In effect, regulatory agencies act as courts and mediators to prevent unreasonable actions by any party to the establishment of public utility rates and/or decisions on other matters of public interest.

Interpretation of the law in the *Memphis* case by the court has injected an unreasonable element—**mandatory approval of rates by the customer.** Paradoxically, the supplier is not granted an offsetting element — that of refusal of service in unprofitable operations. He would still have to provide service even if it ultimately bankrupted him.

True enough, very few gas distribution companies are regulated by the FPC. But, the state laws under which nearly all distribution companies **are regulated** are patterned on the same principles that established the FPC.

If the *Memphis* decision should become an established precedent, it is conceivable that — ultimately — a distribution company could not raise its rates to *its* individual customers without obtaining their *unanimous* consent. It would be foolish to even consider that a distribution company could ever obtain such unanimous consent; yet that, in essence, is what the court's decision in *Memphis* could mean.

The result would be complete stalemate — and eventual extermination of private enterprise in the gas industry.

SOMETHING CAN BE DONE ABOUT THIS. Unified action by all phases of the gas industry is needed. Support must be given to both pending and new legislation, such as the Harris-O'Hara bill, plus any new bills that will clarify the intent, purpose, and procedures of regulation of the industry by the Federal Power Commission.

Unity in the gas industry — with all elements working shoulder-to-shoulder instead of paying lip-service to each other's problems — will insure continued growth and prosperity for the industry.

— *The Editors*

(On pages 14-16 of this issue, you will find an analysis of what the Memphis case decision means to the gas industry. It was prepared especially for American Gas Journal by a leading attorney in the gas industry. Appending the article is a resume of remarks made recently by the chairman of the F.P.C.)

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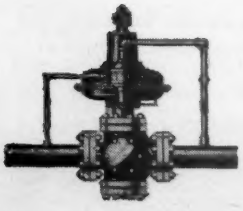
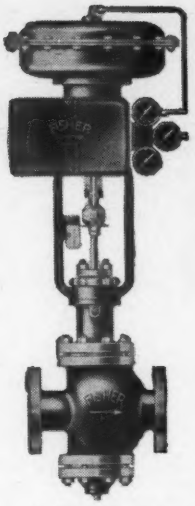
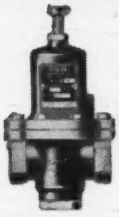


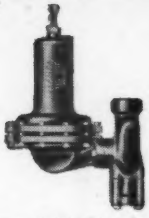


Type 657 with 3500 Positioner

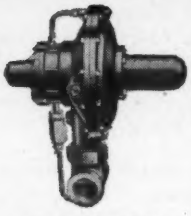
Type 4150 and 4160 Wizard II Pressure Controllers



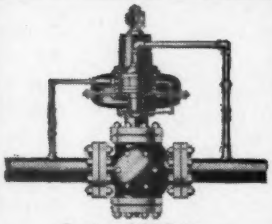
Type 95 Pressure Reducing Valve



Type 630 "Big Joe" Field Regulator



Series 99 Multi-Purpose Gas Regulator

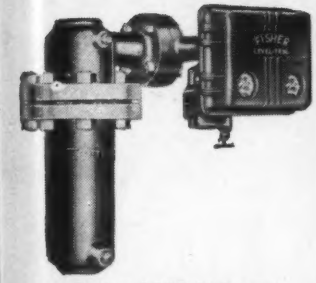


Series 298T Gas Regulators

Type 655-A Pressure Regulator

IF IT FLOWS THROUGH PIPE ANYWHERE IN THE WORLD . . . CHANCES ARE IT'S CONTROLLED BY.

YES! *now you can shop by phone, wire or TWX...* for shipment within 36 hours!



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FACTORY STOCK ALWAYS ON HAND:

- Large stock of BORDER & DISTRICT REGULATORS
- Wide choice of GAS REGULATORS
- Assorted types of MULTI-PURPOSE REGULATORS

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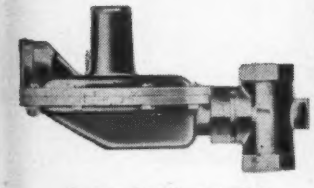
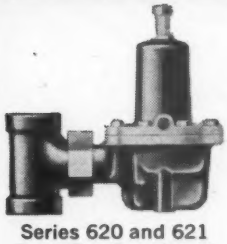


Series S100 and 730 Service Regulators



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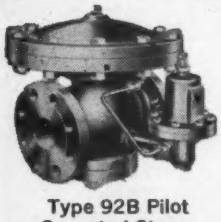

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Series 67FR Combination Filter Regulator

Fisher's new special service department is organized much like a super market to help you meet emergency requirements with dispatch and speed.

A stock of the popular and standard diaphragm control valves, Wizard Controllers, level-trols and all types of gas regulators are kept on the shelf at all times ready to go.

Every Fisher representative receives a weekly list of all available types for the following week.

Now, when you're up against an emergency, phone, wire or TWX (Marshalltown 578 or 579) the factory or your Fisher representative ... your order will be enroute within 36 hours (except Saturday and Sunday) after it is received in Marshalltown.

FISHER® Controls

SINCE 1880

FISHER GOVERNOR COMPANY

Marshalltown, Iowa/Woodstock, Ontario/London, England

IT'S BRAND

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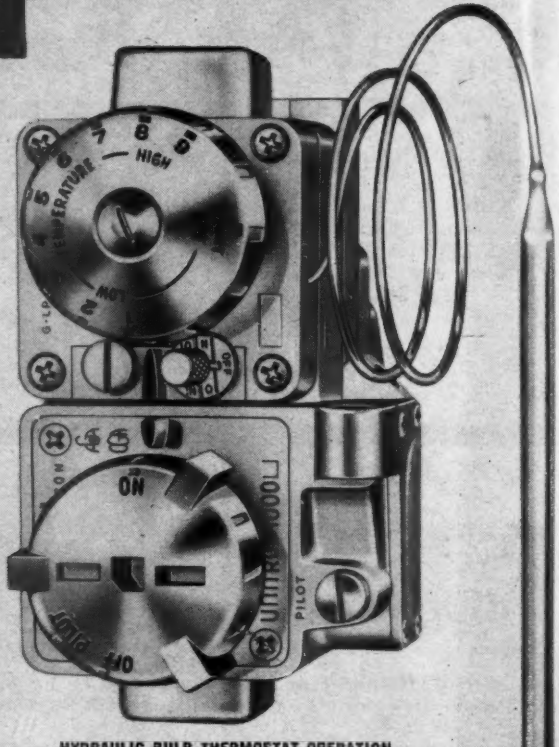
ROBERTSHAW UNITROL 1000



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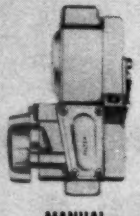
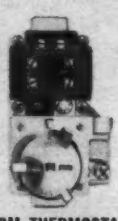
BIGGEST SPACE AND CENTRAL GAS HEATING CONTROL DEVELOPMENT IN YEARS ...YET SO COMPACT!

HERE IS A NEW WAY TO LOWER INVENTORY AND SERVICE COSTS: IN THE FIELD... IN YOUR PLANT, WITH NO SPECIAL TOOLS REQUIRED, YOU CAN SELECT COMBINATIONS OF THE BASIC CONTROL (MANUAL OPERATION) AND ANY OF THESE FIVE UNITS TO PROVIDE FOR HYDRAULIC BULB OR ROOM THERMOSTAT OPERATION.

- Snap action, self-contained, hydraulic thermostat
- Snap full on—Snap off to bypass hydraulic thermostat
- Snap on to high flame—Throttle down to bypass—snap off, hydraulic thermostat
- Room thermostat silently operating gas valve (24 volts)
- A gas pressure regulator



MANUAL OPERATION



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Robertshaw-Fulton CONTROLS COMPANY

GRAYSON CONTROLS DIVISION, LONG BEACH, CALIFORNIA

The new Superior ALUMINUM CASE METERS

. . . the slow-motion meters you can rely on longer

This slow-motion, long-lived meter operates at only 7 revolutions per cubic foot to reduce wear and stay accurate longer. And its simple, horizontal seam construction gives fewer chances for leaks . . . makes maintenance quick and simple. Whether it's adjusting the tangent through the handy access in the top . . . removing the top to grind the valve seat . . . or lifting out the valve table with the entire inner movement to replace the diaphragm, simply loosening a few screws makes everything accessible.

Get full details. Send for bulletin 1150.

This modern meter exploits all the time-tested advances in meter technology *plus* the latest manufacturing techniques of Superior's new plant.

SUPERIOR METER COMPANY, INC.
19 West 50th Street, New York 20, N. Y.
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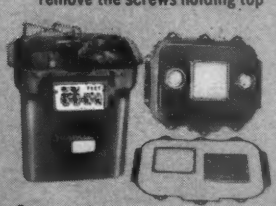
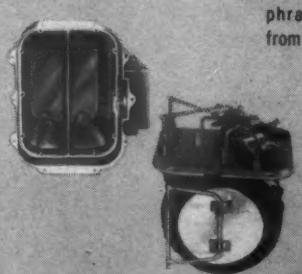
neptune

Look at these advanced design features:

1. Simple, horizontal seam . . . eliminates leakage . . . easier maintenance
2. Easily accessible table . . . just remove the screws holding top



3. Meter top removable without taking off index box
4. Valve seat readily accessible for grinding when top is removed
5. Slow movement; only 7 revolutions per cubic foot
6. Seam gasket stays resilient . . . cork and Buna-N composition
7. Valve table lifts out with entire mechanism



8. Heavy-duty, sintered bronze bearings oil-impregnated for life
9. Flag arrangement gives arm smoother operation and longer life
10. Accurately controlled diaphragm . . . no inaccuracies from deflection
11. Cupped handling lids permit easy and safe carrying
12. Handy access for tangent adjustment and calibration
13. Broad base for solid stacking . . . designed for conveyorized handling
14. Index removable without removing meter

In 250 cfh and 340 cfh sizes to meet most domestic requirements.

'1200'

A good number to remember

gives widest range control... no other like it!

- Ready for installation . . . no field connections needed
- All-steel construction . . . stainless steel trim
- Pilot loaded for accurate control
- Large capacities 529,000 cfh at 800 psi inlet

Single seat valve with molded in place disc—balanced against inlet pressure thrust.

Size—2" flanged Series 60 (Series 30 Optional)

Working Pressure—1200 psi (Series 30-600 psi)

Outlet Pressure

With Type S1 Pilot	50-150 psi
Type S2 Pilot	50-300 psi
Type S3 Pilot	50-600 psi

Face-to-Face

Series 60	10½"
Series 30	9¾"

for complete information write for bulletin 1200

You could look high and low and not find another gas regulator like this Model 1200 in the business. It's compact and self-contained, designed for rugged high-pressure service with Chaplin-Fulton accuracy. No field connections needed—a 2" integral unit ready for installation. Actually, this Model 1200 is an all-steel version of our widely accepted Model 1100 . . . now ready to help solve your high-pressure problems.

ACCURATE CP DEPENDABLE

MFG CO

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Chaplin-Fulton

MANUFACTURING COMPANY

Pittsburgh 25, Pennsylvania

Coming Events

IN THE GAS UTILITY INDUSTRY

February

3- 7 Western Winter Radio-Television & Appliance Market, Western Merchandise Mart, San Francisco, California.
13-15 National Society of Professional Engineers, Michigan State University, East Lansing, Michigan.
26 NEGA street department supervisors group, Hotel Bancroft, Worcester, Massachusetts.

March

17-21 National Association of Corrosion Engineers, San Francisco, California.
20-21 NEGA, annual meeting, Hotel Statler, Boston, Massachusetts.
24-26 Mid-West Gas Association, Broadmoor Hotel, Colorado Springs, Colorado.
27-28 Oklahoma Utilities Association, annual convention, Biltmore Hotel, Oklahoma City, Oklahoma.
31-April 2 GAMA, annual meeting, Greenbrier, White Sulphur Springs, West Virginia.

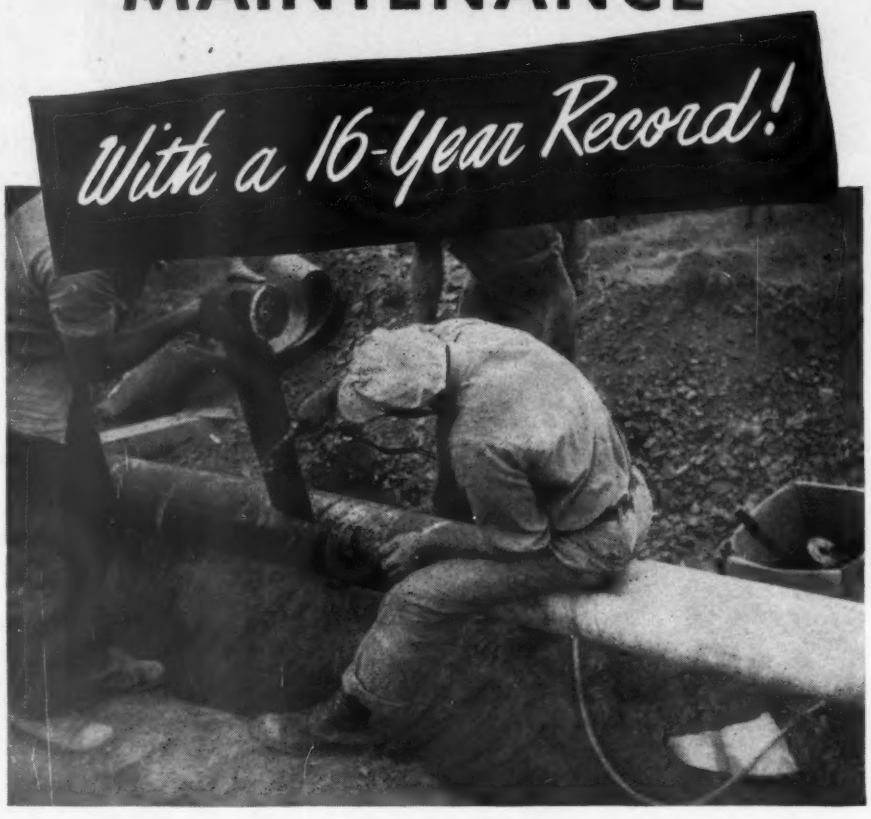
April

8-10 AGA sales conference on industrial and commercial gas, Hotel Schroeder, Milwaukee, Wisconsin.
14-16 National Conference of Electric and Gas Utility Accountants, Shamrock Hilton Hotel, Houston, Texas.
15-17 Southwestern Gas Measurement Short Course, University of Oklahoma, North Campus, Norman, Oklahoma.
17-18 Indiana Gas Association, annual convention, French Lick-Sheraton Hotel, French Lick, Indiana.
21-23 AGA research and utilization conference, Hotel Carter, Cleveland, Ohio.
28-30 SGA annual convention, Dallas, Texas.
29-30 PCGA distribution conference, Tucson, Arizona.
29-May 1 PIEA-PESA, joint convention, Adolphus Hotel, Dallas, Texas.

May

1 PCGA accident prevention conference, Tucson, Arizona.
4- 7 LPGA annual meeting, Conrad Hilton Hotel, Chicago, Illinois.
4- 7 Air Conditioning & Refrigeration Institute, annual meeting, The Homestead, Hot Springs, Virginia.
5- 9 AGA distribution, production, and transmission conference, The Roosevelt and Commodore hotels, New York, New York.
5- 9 National Restaurant Association convention and exposition, Navy Pier, Chicago, Illinois (AGA will exhibit).
5- 9 AGA commercial gas school, Edgewater Beach Hotel, Chicago, Illinois.
12 PCGA industrial gas school, Los Angeles, California.
15 NEGA operating division, Sheraton-Biltmore, Providence, Rhode Island.
18-21 Industrial Heating Equipment Association, The Homestead, Hot Springs, Virginia.
19-21 AGA mid-west regional gas sales conference, Edgewater Beach Hotel, Chicago, Illinois.
19-23 National Fire Protection Association, annual meeting, Palmer House, Chicago, Illinois.
20-21 PCGA customer service conference, Olympic Hotel, Seattle, Washington.

PREVENTIVE MAINTENANCE



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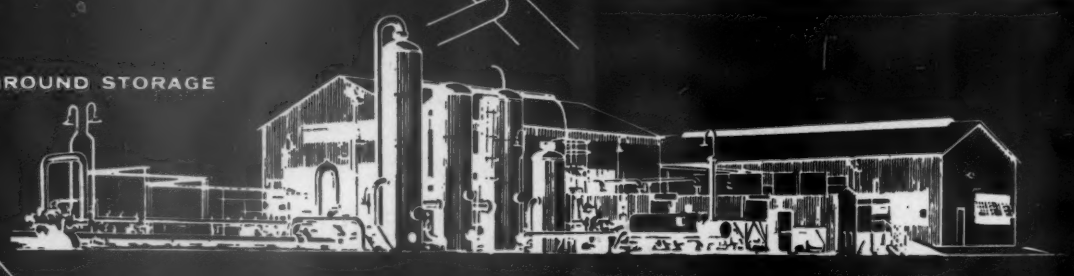
METERING AND REGULATING STATIONS

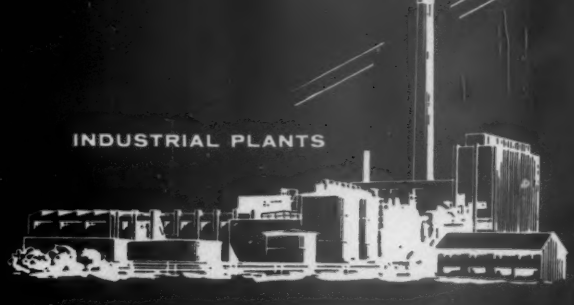
UNDERGROUND STORAGE



TOWN BORDER STATIONS

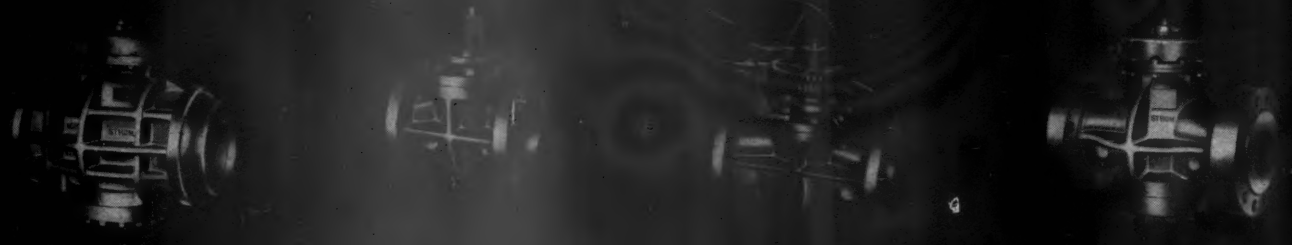
RESIDENTIAL

INDUSTRIAL PLANTS



ROCKWELL-Nordstrom VALVES

it's ROCKWELL MANUFACTURING COMPANY



Enthusiastic support of AGA's air conditioning program has made unnecessary a series of symposiums scheduled in January and February to stir up interest in gas air conditioning by utility companies and manufacturers. When AGA's promotion committee was established last June, one of its goals was to stimulate sales of at least 4600 direct-fired residential gas absorption units for 1958. Commitments for 1958 are already past this goal by more than 50 percent.

Columbia Hydrocarbon Corporation is name of a new wholly owned subsidiary formed by the Columbia Gas System, Inc., to operate in Kentucky. The new firm will operate a fractionation plant at Siloam and sell its natural gas product to other Columbia subsidiaries.

More than 440,000 gas dryers will be sold in 1958, predicts the American Home Laundry Manufacturers' Association, an increase of 42,000 over 1957. Combination washer-dryer unit sales are predicted to rise in 1958 to 250,000, an increase of 70,000 over 1957 sales.

Whirlpool Corporation, St. Joseph, Michigan, is in the gas refrigerator business by virtue of its acquisition of the major part of facilities owned by Servel for manufacture of home appliances. Sale price for the Servel facilities was $6,500,000, and included 24 acres of land; 750,000 sq ft in building floor space; machinery, equipment, tools, dies, jigs, and fixtures; patents and trademarks, and Servel's inventory. Servel, in turn, paid Whirlpool $1,600,000 for assuming full responsibility for fulfilling unexpired warranty obligations on Servel products — refrigerators, ice makers, food freezers, and Wonderbar Refrigerettes.

Whirlpool's acquisition has several important benefits to the industry:

. . . continued availability of parts and service for warranty obligations.

. . . Whirlpool, a leading appliance manufacturer, will be able to offer a complete line of gas appliances, all under one widely known brand name.

. . . gas utilities can look forward to continuation of important revenue from sale of gas refrigerators and sale of gas to keep them going.

Whirlpool presently manufactures gas ranges, gas dryers, and a combination washer-gas dryer. A gas heater and a gas incinerator are in the engineering stages. The firm is also rumored to be interested in gas air conditioning.

Central Indiana Gas Company has petitioned the Indiana PSC for permission to develop an underground storage area in Randolph County to meet the needs of consumers in the eastern part of the state. The facility, to cost $450,000, would use a labyrinth of "played out" gas wells. Plans call for completion of the storage space for use in the 1958-59 winter heating season.

Housewives on Montreal Island are cooking with natural gas. Initially, the gas comes from U. S. sources via Toronto, but completion of the Trans-Canada pipeline is due in several months, bringing western Canadian gas. At present, there are 250,000 gas customers on the Island of Montreal, and Quebec Natural Gas Corporation, their supplier, anticipates adding many more. Conversion of the firm's distribution system and extension of mains to new sections of the island has been completed.

Equitable Gas Company of Pittsburgh, Pennsylvania — like most U. S. gas utilities — finds itself in an ever-narrowing pinch, pressed by increasing costs of labor, materials, and gas. To continue to grow, it must borrow money — and interest rates keep going up. One result is decreasing return on its investment. Amusingly enough, the assistant city solicitor of Pittsburgh described Equitable's recent rate increase request before the state Public Utility Commission as showing "total failure to accept any part in the common responsibility to arrest inflation." He is also quoted as saying that company appears to feel that "a dollar spent entitles it automatically to recover this expense from the consumer."

It is no secret that the cost to the consumer for top-quality gas service lags far behind when compared to other commodities. And, if it is not an impertinent question, where else does a public utility derive its revenue if not from its customers?

Rate Notes. Washington Gas Light Company has filed requests with public utility commissions of the District of Columbia, Virginia, and Maryland for an 8.8 percent annual rate increase that would boost earnings $4,300,000 and increase its rate of return from 5 to 7 percent. The rate increases, if granted, would be the first in 35 years for the firm's operations in Virginia, only the second increase in Maryland in 37 years. Two other increases have been granted in DC in the past five years . . . **San Diego Gas & Electric Company** has filed for an increase in gas rates in its service area. In the 25-year period since introduction of natural gas in 1932, the company has had 11 rate reductions and only one increase. The firm pointed out that projected earnings studies for 1958 indicated a 4.86 percent rate of return; it seeks a 6.75 percent rate of return, the same as recently granted other California gas utilities . . . **Michigan Consolidated Gas Company** has asked the state PSC for permission to increase rates by $15,500,000 annually so as to realize an approximate 7 percent net return on its $272,621,000 investment in natural gas properties. A three-fold proposal was made by the firm; 1) an across-the-board rate boost of 8⅓ percent, 2) elimination of a 3 percent prompt payment discount, and 3) raise monthly minimum charge from $1.25 to $1.50. MichCon won its last general rate increase in 1954. Approximately 80 percent of its customers are in the Detroit area . . . **Alabama Gas Corporation** has received state PSC permission to increase rates for both industrial and residential users. Industrial rates are effective in February and residential rate increases in March. The increase, generally, is about 10 percent, and was necessary to cover increased cost of gas to the utility . . . **Consolidated Edison Company of New York** has been authorized by the state PSC to increase its monthly minimum charge for gas service from $1.20 to $1.50. Effective with 1958 meter readings, the charge affects those customers (out of a total 1,324,000) who use less than 300 cu ft per month.

Winch truck is used to lower elbow section at point of tie-in.

Welders working on 16-in. gas main tie-in.

Relocating 16-in. Gas Main To Accommodate Big Storm Sewer Creates Special Problems

R. A. Schoger,
Gas Engineer, Iowa Public Service Company
Waterloo, Iowa

AT ONE TIME, large high-pressure distribution feeder mains, once they were laid to rest in their underground spot, were considered relatively safe. Not so today, with increased multiple lane street and highway construction and its accompanying storm sewer laying in cities and suburban areas.

In Waterloo, Iowa Public Service Company encountered the problem of lowering a 16-in. steel main made necessary by a highway project. This main, which operates at 62 psi, carries most of the gas fed to some 9000 meters in an area east of the Cedar River in Waterloo.

Ditch, cut to 11 ft depth, was made wide enough to allow men to work in it.

U.S. Highway 20 through Waterloo was to be relocated. Undeveloped areas of the city on either side of the new highway — which did not have storm sewers — had to be connected via feeders across the highway before paving operations were begun.

The Waterloo city engineer decided that a 60-in. ID concrete tile storm sewer would be needed across the highway a few blocks from the east side of the downtown business district. This meant that the 16-in. gas main would have to be moved.

This presented a special problem as the gas main was the only feeder main to the east side of the river on the high-pressure system.

Elevations were obtained of the proposed sewer and compared with the 16-in. main elevation. The main had to be lowered because elevation of the top of the sewer was the same as the top of the gas main, and final grade of the bottom of the highway slab was only 6-in. above the gas main.

Relocation Method Developed

Details were then formulated to shut off and relocate the main to a depth of 11 ft to permit the 60-in. storm sewer to pass over the gas main.

After considering various methods, it was decided to close the nearest valves and take 4800 ft of 16-in. main out of service. No customers are served directly from this section. As much work as possible was done prior to the actual tie-in.

Actual shutdown had to be done on a Sunday during the summer. Gas used by commercial and industrial customers on a firm basis would be at a minimum on Sunday, and there would be no residential heating problem in the summer.

Space heating customers using over 500 cu ft per hour are sold gas on an interruptible basis, and they could use their standby fuel facilities. These included the IPS power plant, which uses 10,000 Mcf per day on a summer day, and The Rath Packing Company, which uses 4000 Mcf on a typical summer day.

Advance Work Helps

During the week of August 4-9, an 11-ft ditch was dug 6-ft from the existing 16-in. main. The relocated section was laid in this ditch to the point of tie-in, and was tested for leaks with 100 psi air. Backfilling was then completed to a depth of 5-ft.

Other operations during this time included:

- Checking and greasing valves scheduled to be closed for tie-in, to make sure they would close easily.
- Notifying the gas plant to have its 500,000 cu ft sewer gas storage holder pumped down so pumping could be stopped at 7 a.m. Sunday and gas be stored. (Note: 300,000 cu ft of sewer gas is purchased daily and mixed with natural gas.)
- Notifying the service department to

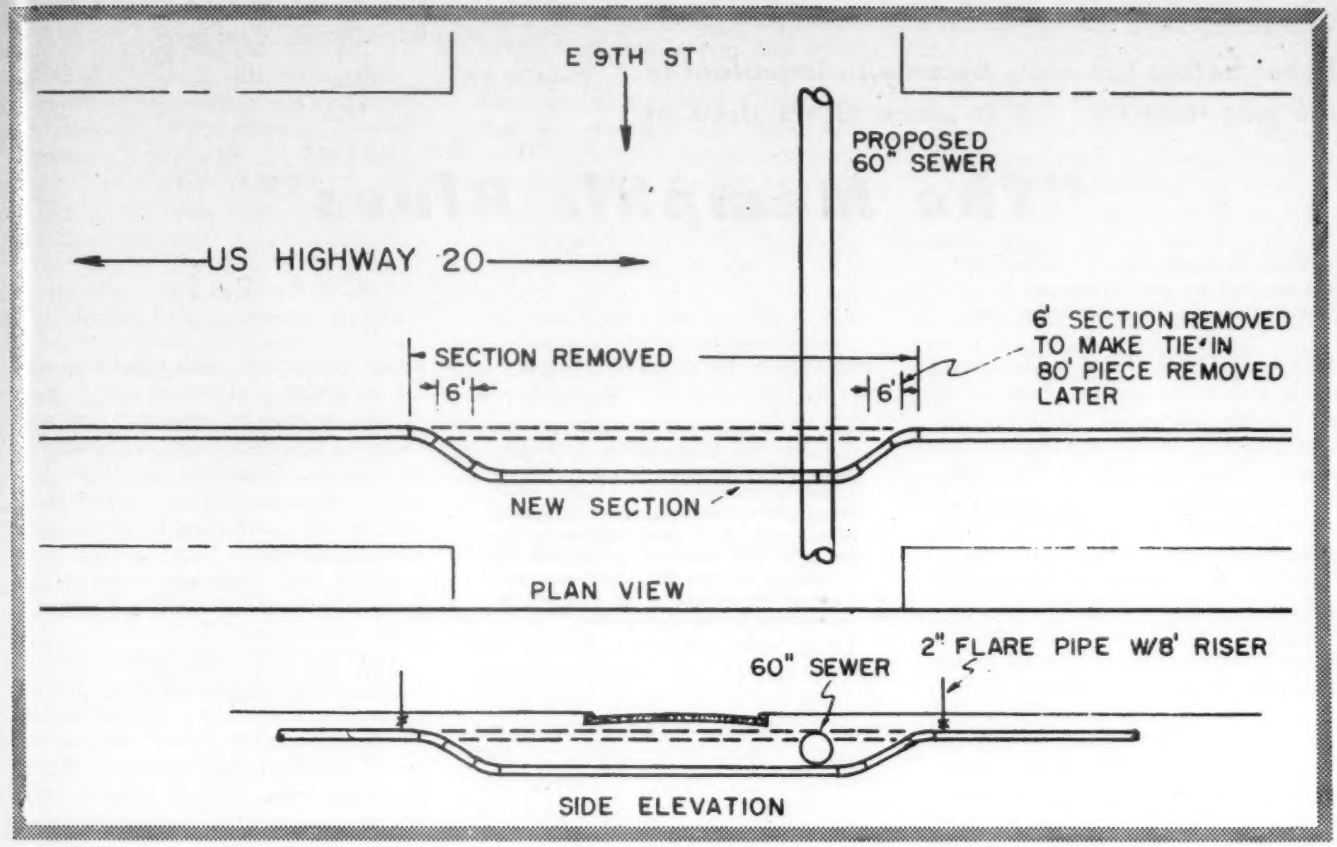


Diagram shows plan view and side elevation of relocation project.

stand-by on Sunday.

- Notifying city police and fire departments for traffic.
- Notifying fire department that flaring would be done on Sunday.
- Installing a 2-in. valve on the 16-in. line on the hot side of each tie-in to flare gas and to control fire in case of valve leakage.
- Checking regulators in downtown area for proper operation. (Only two regulators are used to feed the downtown area and one was to be shut on the Sunday when tie-in was to be made.)
- Having gas dispatcher contact 29 interruptible customers and inform them of the service curtailment for that Sunday.

Making the Tie-In

Sunday, August 4, was "tie-in day." At 6:30 a.m., the project engineer and a two-man crew began making the rounds to close the valves isolating the 4800-ft section of the 16-in. main. This included two 16-in. valves, two 12-in. valves, and one 6-in. valve.

At 7:00 a.m., the valves were shut and the crew at the construction site began to flare the approximately 35,000 cu ft of gas remaining in the isolated section.

Flaring of the gas was completed at 7:20 a.m., and welder began cutting the 16-in. pipe. By 7:30 a.m., checking of pressures was completed.

Work then began on welding of the two tie-ins, and this work was completed by 2:00 p.m., including welding shut one of the 2-in. flaring connections. A low-pressure pipe stopper was installed in the hole used for the other flaring riser.

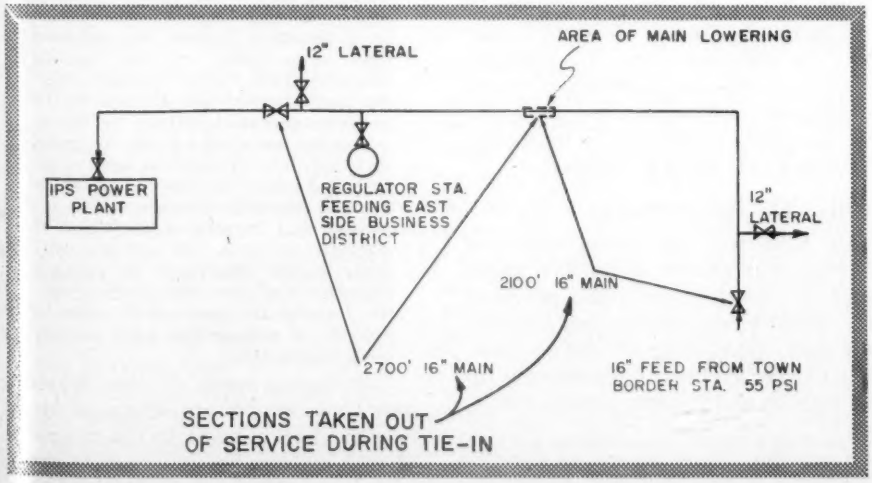
A 16-in. valve was opened slightly and the new section purged until the explosion meter showed it contained all gas. The stopper was then reversed and the line was purged from the other direction in the same manner.

After purging was completed, the purge hole was welded shut and the main was pressurized to 62 psi. A check was made for leaks. The two 16-in., two 12-in., and the 6-in. valves were then opened.

At 3:15 p.m., the dispatcher was called and notified that the interruptible customers could be released.

Interestingly, the gas burned from nearly all of the 4800-ft section of 16-in. pipe by burning back from open ends of the 16-in. pipe. There was no puff or flash at anytime, as the valves held tightly. Purging operations took only 45 minutes for the large volume of gas that had to be displaced.

The entire project was completed as planned with all work going according to schedule and no mishaps were encountered. * * *


12" LATERAL
AREA OF MAIN LOWERING
IPS POWER PLANT
REGULATOR STA. FEEDING EAST SIDE BUSINESS DISTRICT
12" LATERAL
2100' 16" MAIN
2700' 16" MAIN
16" FEED FROM TOWN BORDER STA. 55 PSI
SECTIONS TAKEN OUT OF SERVICE DURING TIE-IN

Drawing shows location of 4800 ft section of 16-in. main taken out of service during tie-in operation.

Great things are done when men and mountains meet;
This is not done by jostling in the street.
— WILLIAM BLAKE

Never before has unity become so important to the gas industry . . . if it plans to rid itself of

"The Memphis Blues"

Willis L. Lea, Jr.
Vice President and General Attorney
Southern Union Gas Company, Dallas, Texas

THE GAS INDUSTRY is discovering more and more serious implications in the *Memphis* case decided a few weeks ago by the U. S. Court of Appeals in Washington, D. C. This decision is the latest of several judicial reverses suffered by the industry in the past 3½ years.

Sober reflection has convinced many people that the *Memphis* case, if affirmed by the United States Supreme Court, will be as revolutionary to the gas industry as the *Phillips* case, decided by the Supreme Court on June 7, 1954. (It was the *Phillips* decision that subjected natural gas producers to regulation by the Federal Power Commission under the Natural Gas Act, contrary to all prior administrative and judicial precedent since the Act was passed in 1938.)

What the *Memphis* Case Does

The Court of Appeals, overruling the Federal Power Commission, decided that United Gas Pipe Line Company as a natural gas wholesaler could not, **without its customer's approval of the new rate,** file an increased gas rate under the Section 4 procedure of the Natural Gas Act, even though the customer's service agreement provided that payment would be made under "any effective superseding rate schedules on file with the Commission."

This means that the "regulatory lag" affecting natural gas companies under the Act will be of indefinite duration and under relatively strange procedures.

The decision is a radical outgrowth of its forerunner, the *Mobile* case decided by the Supreme Court in 1956.

Previously, and for many years, the natural gas companies were authorized to file tariff schedules to increase their gas rates, using the procedures of Section 4 of the Act. The Federal Power Commission, under this Section, may suspend effectiveness of the proposed new rates for a period not exceeding five months, at the expiration of which the new rates may be put into effect, subject to refund if found to be excessive following the eventual hearing.

The *Memphis* case, if it is affirmed, declares an end to the use of these procedures by the natural gas pipelines, unless their customers have agreed to pay the specified new price. As the Court said:

> **". . . for the Commission to review rates under the more expeditious procedure of Section 4(e), the seller must bring to the Commission a negotiated agreement. And that agreement to the new rate must be as specific in its terms as was the previous contractual agreement to the rate schedule sought to be superseded."**

Unless the customer agrees to the specific rate change, a pipeline would be relegated to the seldom used provisions of Section 5, which authorize the Federal Power Commission to deal with rates upon receipt of a complaint. The natural gas companies would be put in the position of moving the FPC to investigate and to find their own rates unjust, unreasonable, or discriminatory.

But the crux of the difficulty lies in the fact that under Section 5 nothing could be done, either by the gas company or the commission, to correct rates until after full hearing, deliberation, and decision by the agency — which is becoming more and more overburdened and understaffed.* Even then a higher rate could be ordered only afterward, when subsequently filed by the pipeline under Section 4.

The Federal Power Commission and the Solicitor General have filed a petition with the United States Supreme Court seeking to have the *Memphis* decision reviewed and if possible reversed, so as to reinstate the use of the former Section 4 procedure at least in those instances where it is apparent that the parties to a natural gas service agreement contemplated the possibility of rate changes through the traditional Section 4 rate filing procedures.

What *Memphis* Means

If sustained, the *Memphis* case sweeps away another established guidepost or standard which had governed gas industry relationships and activities for many years. Like the *Phillips* case, it portends intensive congressional investigation and possible remedial legislation. If required, such legislation will not be simple to author or easy to pass — and it may be assumed that any remedial legislation will, in the course of possible enactment, undergo important changes, like the several Harris-type bills proposing to correct the *Phillips* decision.

As an end result the rules of the game may be found not at all restored to the *status quo.*

The *Memphis* case means that a period of uncertainty lies ahead for all elements of the industry. If the pipeline companies cannot absorb the cost of new or augmented gas supplies without invading capital, they are bound to curtail expansion plans – as some have already done.

In turn, the producers cannot take undue risks in exploring for gas supplies that may not be needed, or paid for at adequate price levels.

Finally, the distribution companies cannot make plans based upon diminishing, instead of expanding, sources of gas supply.

The consumer is the eventual loser in the chain.

Financing plans of all these industry elements may be adversely affected and retarded by a continuation of the uncertainties springing up from the *Memphis* decision. The petition of the Solicitor General for review of this case in the Supreme Court contains the following statement:

> **"Since under the [Court of Appeals] holding rate changes may, as a practical matter, be obtained only propectively at the conclusion of Section 5(a) proceedings, without any interim rate protection, the pipelines generally will not be able to secure the financing needed to expand their facilities in order to meet widespread demand for gas among existing and potential consumers. We are advised that, because of the [Court of Appeals] decision, one and probably more major financings of pipeline expansions to serve the growing public demand for gas, which were in process of negotiation, have already been suspended."**

One consequence of the decision may be to confer an advantage upon new pipeline projects in the competition for gas supplies and markets. Such projects would not be handicapped by provisions contained more or less gen-

*EDITOR'S NOTE: From 1938 to mid-1954, approximately 2500 gas cases were docketed by the FPC; in the period of mid-1954 to date, over 11,000 more cases have been docketed — more than four times as many in 3½ years as in the previous 16 years.

erally in gas service agreements of some of the older pipelines.

Ironically enough, the gas-service-agreement-tariff-schedule procedures were imposed by the Federal Power Commission some years ago. The commission had initially accepted the industry's existing negotiated contracts as "service agreements."

Later, under efforts commenced before the war and completed in 1948, the pipelines were compelled to file tariff rates in exact dollars and cents to be paid for under a service agreement (in lieu of the former negotiated contracts). The service agreement procedure, as initially conceived and uniformly followed, contemplates the adjustment of rates payable by following Section 4 of the Act.

The Solicitor General's petition for review of the *Memphis* case contains the following:

> **"The form of service-agreement-plus-tariff involved in this case has become general throughout the natural gas industry under the Commission's Order No. 144, and the holding below has seriously upset the stability prevailing throughout that industry since 1948 when that Order established the system of service-agreements-plus tariffs. Having surrendered the specific rate increase and adjustment clauses of their superseded contracts, the pipelines must be able to meet steadily rising costs by periodically filing new schedules under Section 4(d), which even after initial suspension, become effective subject to refund under Section 4(e)."**

All Industry Elements Should Oppose *Memphis* Principles

There is danger and financial distress ahead for some of the pipelines if the decision is not reversed, preferably by continued litigation but by remedial legislation if necessary. Some of them have reportedly cancelled or suspended important pipeline projects because of the paralyzing uncertainty in the ramifications of *Memphis*.

Natural gas producers may take alarm from the *Memphis* case doctrine since it arises under an Act of Congress by which they are now regulated. No relief has been obtained for them in the congressional sessions that have intervened since the *Phillips* decision, although the battle still is being waged with great hopes and undiminished vigor.

Gas distribution companies dependant upon interstate wholesalers for some or all of their gas supplies, may well reappraise any initial feeling of comfort derived from the *Memphis* case. Gas supplies may be adversely affected. Future plans may require alteration, and expansion programs may also need review.

If there is any comfort to be derived from the Memphis case, surely it must be the comfort felt by the competitors of the gas industry, not by any of its own members.

The decision establishes a new frustration for deserved rate adjustment during a period of general inflation, when gas industry costs have exceeded the averages. It is a retarding influence when expansion is the cornerstone of our dynamic industry, the nation's sixth largest.

The rate frustration may be only a step away from involving gas distribution companies, many of whom depend upon state statutes containing provisions more or less similar to the Natural Gas Act's Section 4 and 5 which are called into question by the *Memphis* decision.

Some Recent Developments

The Washington, D. C., court reached the same result in another case, involving Willmut Gas and Oil Company, decided December 26, 1957.

In spite of the *Memphis* and *Willmut* cases the Federal Power Commission, with two members dissenting, has permitted an increase of El Paso Natural Gas Company to go into effect under the Section 4 procedure, at the expiration of the five-month suspension period on December 31, 1957.

The commission said that since review was being sought in the *Memphis* case, pending clarification of the problems it would permit the El Paso Natural adjustment to go into effect; but it imposed requirements for the filing of corporate surety bonds or, in the alternative, for escrowing the increased revenues in order to assure the full refund of such moneys if required by affirmance of the *Memphis* doctrine.

Nevertheless, El Paso Natural has filed a request with the commission insisting that it rule expressly upon motions previously filed by certain of El Paso Natural's customers seeking to have the commission reject the El Paso Natural increase out of hand because of the *Memphis* case.

These motions were filed by the California distributing companies after the State Commission ordered that the step be taken. The pipeline company represents in this connection that the adverse motions will, until decided by the commission, create a serious obstacle to obtaining the credit and financing necessary to proceed with the construction of additional facilities — as proposed by the company — for which it has spent over $50,000,000 of equity capital and for which the sale of additional debt securities will be required to raise the total sums necessary for completion of the projects.

Unless the company can complete these projects before the gas supply contract deadlines, it says the gas may be lost to its markets which are in great need of the additional supplies.

The *Memphis* case has led the City and County of Denver to file a motion asking FPC to reject the rate filings and to dismiss the proceedings of Colorado Interstate Gas Company in four dockets, all of which relate to rate increases sought by the pipeline. Over $55,000,000 of increased revenues are said to be involved in the four cases. The natural gas company has filed its motion with the commission seeking a continuance of certain hearings in the latest docket to give it time to engage in settlement negotiations with its customers; and such motion has been granted.

The company says:

> **"Since January 1, 1954, when the rates in G-2260 were put into effect subject to refund, the revenues which Colorado Interstate would be entitled to earn have been indefinite and subject to refund. In fact, it would have no net revenues if all pending increases were denied."**

Chairman Kuykendall of the FPC in an address on January 3, 1958, states:

> **"If the Memphis case becomes the law of the land, it would seem to follow that all pipeline companies which presently are collecting increased rates subject to refund under Section 4 must refund all of such sums to their customers. As of November 1, 1957, the total amount being collected subject to refund was about $217,000,000 per year, and the total amount subject to refund for the total time all existing suspended rates had been in effect was approximately the same amount.**
>
> **"Indeed, it may rather logically be contended that all rate increases obtained at any time since the passage of the Natural Gas Act, by unilateral rate filings under Section 4, are a nullity and must be refunded, with the possible exception of those cases which were settled by agreement of all parties and with approval of the commission."**

State Commission attitude has not been unanimous. The New Mexico Public Service Commission and Attorney General have urged the FPC to overrule the California motions against El Paso Natural based on *Memphis*, asserting that the case is an extension of the *Mobile* case, which is wholly unwarranted by anything in the Natural Gas Act.

The welfare of the entire natural gas community deserves and requires a constructive, statesmanlike position seeking to restore the right to obtain rate adjustments promptly under the former procedures which were long established and well understood over a period of nearly 20 years.

Serious regulatory delay or uncertainty should be a common enemy because it threatens the utility's fair rate of return — the cornerstone of progressive public service.

Q's and A's on the Memphis Case. At the January 3 meeting of the New York Society of Security Analysts, Jerome K. Kuykendall, chairman of the FPC, was featured speaker. He discussed the *Memphis* case at length. Following his talk, a question and answer session was held. Here is a resume of the questions asked and the replies by Kuykendall:

Q. Can natural gas companies that have put rate increases in effect under bond be compelled NOT to include the amount of these increases in revenues?

A. The Federal Power Commission has a prescribed system of accounts but this does not cover reports to shareholders, etc. Thinks all companies should so report the facts that they will readily be apparent so that analysts and others will know the situation.

Q. To what extent does the court order in the Memphis case apply to possible refunds in cases already decided by the FPC? Are these cases for past periods now closed?

A. Cannot give a firm answer to this legal question. The FPC staff and lawyers have discussed the case and they lean to the opinion that a fair contention can be made that customers of a natural gas pipeline can go back to the inception of the Natural Gas Act in 1938. In the Phillips case, however, the Commission set June 7, 1954, as the starting point for the regulating producers under the Act even though it was clear under the decision that it covered all cases all the way back. But there have been no complaints on this score to date.

Q. If a pipeline company can negotiate settlements with its customers, would the customers under the Memphis decision have the right to approve past as well as future rates?

A. Several pipeline companies now are negotiating with their customers and are reported to be optimistic on settling past as well as future rates.

It is a matter of common sense that parties have the right to agree on past cases as well as on present ones.

Q. Does the Memphis decision require consent of all customers of a pipeline or would agreement by 99 out of 100 suffice?

A. Each and every customer must agree.

Q. Didn't the Memphis decision cover the "undue discrimination" section of the Natural Gas Act?

A. No rate can be considered on a hard and fast basis for each and every class of service. That is why zone rates have been set up to cover a number of city gates — despite the fact that every city gate rate actually should be different.

The law does not say there should be **no** discrimination; merely that there should be no **undue** discrimination.

Q. Would it be possible for the commission now to issue final orders in cases which have been started under Section 4 of the Natural Gas Act?

A. Yes. The Memphis decision is not binding on the commission since there has been no court mandate. The commission recognizes the decision but refuses to abide by it.

Q. In addition to consent of all companies being necessary for rate increases under the Memphis decision, would permission of municipalities be necessary also where they are concerned?

A. Yes, the court decision covers municipalities also. The speaker said he has been informed that the City of Memphis is discussing the problem and is ready to reach an agreement with Texas Gas Transmission Corporation even though Memphis is the victor in the case.

Q. To what extent will state regulatory commission attitude with respect to rates affect the situation?

A. Up to the time of the Memphis decision, the speaker thought that the FPC could make rates without consulting the state commissions. If state commissions now should be able to help bring order out of the present state of chaos, the FPC chairman said he is not too proud to think that the state commissions should be commended for whatever they could do toward accomplishing this end.

Q. Assuming that the Memphis decision stands, could the FPC devise procedures under Section 5 of the Act?

A. You might be surprised how quickly the commission could operate under Section 5. Instead of running away and being evasive under Section 5, as some natural gas pipeline companies have been, the speaker feels now that if pipeline companies thought they could get rate increases they would cooperate quickly and completely with the FPC under Section 5.

Thinks FPC could act with a great deal of speed under Section 5 but does not want to lull anyone into a false sense of security.

The FPC now has over 50 suspended rate cases and hundreds of producer cases. It would have its hands full under Section 5 proceedings.

Thinks it preferable to get legislation to authorize what he always thought was the law prior to the Memphis decision.

Q. Which is preferable from the FPC point of view — a rider to the Harris-Fulbright Bill, or new legislation?

A. Speaker is not a legislator, just the FPC chairman. Won't go into the situation, but added that the FPC favors legislation to nullify the Memphis decision.

Q. Could Section 5 of the Act be made retroactive?

A. No.

Q. Does the Memphis decision affect producer contracts?

A. It has no bearing on producer contracts. They meet the specifications of the Memphis decision, except possibly the "favored nations" clauses of the contracts.

Q. Has the FPC started a program to speed up Section 5 proceedings?

A. Yes, it has.

Q. Who has the burden of proof under Section 5 proceedings?

A. Burden of proof — the FPC always has thought — was on the commission under Section 5 since this section is in the Act to provide the commission with procedures to reduce rates, and the companies in question are defendants.

If a pipeline has inadequate revenues, however, it can seize the initiative and assume the burden under Section 5, which ordinarily is on the commission.

Q. Can the FPC put higher rates in effect under Section 5?

A. The commission cannot put in effect under this section a higher rate than already is in being. But the Supreme Court got around this point in its decision by holding that a pipeline could increase rates and the FPC could say that if the increase is filed the commission will accept the higher rate.

Q. If rates cannot be set retroactively, can the commission consider past history of a company in making rates for the future?

A. It is a good idea **not** to try to change the past and **not to either punish or help** a company because of what has happened in the past. * * *

Company Service Policy Determines Dispatch Procedure

Andrew Tarapchak
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LIKE MANY PROBLEMS common to the gas industry, dispatching of service work is directly dependent on a company's customer service policy and, to some extent, on the organization of its service department.

The Washington Gas Light Company has approximately 375,000 meters, of which some 200,000 include house heating. It is a predominantly free service company. Except where repair parts are required, all service on checking, adjusting, lighting, and cleaning gas appliances is done at no charge to the customer.

A limited amount of merchandising is done; however, installations of appliances sold by the company are taken care of by manufacturers' representatives.

Addition of new customers to the lines of a company greatly increases the work load of various groups within its organization. In Washington, the street department is responsible for complete installation of company facilities up to and including the meter bar on all services involving single meters, 10 lt. and smaller in size. Work performed under direction of the street department includes installation of the house regulator on high-pressure installations. Service department personnel then take over to set the meter, check and adjust the regulator, and check and start connected appliances. Installations of all multiple meters and single installations of 20 lt. or larger are done by service department personnel.

The service department of the Washington Gas Light Company is responsible for all service work performed on customer's premises. This not only includes servicing of gas appliances but also setting, resetting, and changing of meters and turning gas off, turning gas on, and taking statements when there is a change in tenant. This so-called meter work involved nearly 200,000 orders out of a total of approximately 535,000 orders completed in 1956.

To perform the work of the service department, a total of 370 field personnel, excluding supervisors, were required during peak conditions in 1956. This figure varied according to work load as during winter months the normal work force was supplemented by 20 men from the meter repair section. In spring, when the work load is fairly light, the 20 men were returned and some 25 men of the service group were temporarily transferred to the meter repair section.

The 370 field men were classified as:

20—Special Serviceman
305—Servicemen
45—Assistant Servicemen

Special servicemen perform any type of service and meter work that may be given to them. The specialist classification, however, was formed to service more complicated appliances, including air conditioners, pre-mix equipment, and equipment with electronic controls.

Servicemen perform all meter work and all service work, excluding the servicing of air conditioners, pre-mix equipment, and equipment with electronic controls.

The **assistant servicemen** are primarily helpers. Except for lighting of heating equipment (approximately one month per year), these men do not execute orders. They normally accompany and assist other servicemen.

With basically only two classes of servicemen, very little screening and segregating of orders is required. This greatly eases the burden on the dispatch group, as the average serviceman can take any order, from one that requires taking a statement of a meter to checking and adjusting a house heating plant.

The area served by the Washington Gas Light Company covers approximately 408 sq miles. It takes in the District of Columbia and adjacent areas of Virginia and Maryland.

Facilities of the service department include three locations—a main building in the District of Columbia where the majority of service department personnel report, and two substations—one in Virginia and one in Maryland. Dispatching facilities are located in the main building. Substations are primarily used for servicemen to report for assignments, tools, and vehicles. Servicemen's work is made up by the dispatch group at the main location and, between midnight and 8:00 a.m., the work is delivered to the substations. Meters and other materials are also delivered to the substations. Once substation servicemen are in the field, all contact concerning orders and additional work is made with the dispatch group at the main location.

Servicemen are scheduled to work any one of four different shifts, the main one being 8:00 a.m.-4:30 p.m. Men assigned to night schedules work either 2:00 p.m.-10:30 p.m. or 4:00 p.m.-12:30 a.m. Emergency coverage by two crews of two men each is provided from 12:00 midnight-8:00 a.m. A small group of servicemen is as-

Editor's Note: Because the author, Mr. Tarapchak, has covered his company's operations so thoroughly, this final part of the series of modern service request dispatching will appear in two sections. Concluding this informative series will be the second section on Washington Gas Light Company, to appear next month as Part 5.

WASHINGTON GAS LIGHT COMPANY

Order Execution Schedule

Type of Order	Monday - Friday Incl. Normal Execution Schedule	Saturday, Sunday and Holiday Normal Execution Schedule
Gas leak. Fire, explosion or asphyxiation. Accident resulting in personal injury or property damage. Other conditions which in the opinion of order taker create a definite hazard. Customer cannot turn off appliance (Hazardous). Commercial equipment - If customer's business is affected. Service regulator blowing at vent.	Same day - Nature determines promptness. Orders to be marked: "Soon" - Bad emergency only - to be done immediately. "S.A.P." - Rush Order - to be done within 2 - 3 hours.	Same day - Nature determines promptness.
No gas (entire premises). Poor supply (entire premises). Restore service - outage. Meter turned off in error. Customer cannot turn off appliance (non-hazardous). Water heater - No hot water for Commercial establishment or apartment house. Jobbing work - Repair parts essential to operation of house heater, air conditioner or refrigerator.	Same day order is received or Customer's choice of future date.	Same day order is received or Customer's choice of future date.
House heater - No heat. Air Conditioner - No heat. Air conditioner - No air conditioning. Refrigerator - No refrigeration.	Before 7 P.M. - Customer's choice. After 7 P.M. - 1st preference - Next calendar day. (A.M.) 2nd preference - today.	Before 7 P.M. - Customer's choice. After 7 P.M. - 1st preference - Next calendar day. (A.M.) 2nd preference - today.
Water heater - No hot water (residential). Range - Automatic oven. Turn on - Off for bill.	Before 12 Noon - Customer's choice. After 12 Noon - 1st preference - Next calendar day. 2nd preference - today.	Before 12 Noon - Customer's choice. After 12 Noon - 1st preference - Next calendar day. 2nd preference - today.

FIG. 1.

ORDER EXECUTION SCHEDULE

Type of Order	Monday - Friday Incl. Normal Execution Schedule	Saturday, Sunday and Holiday Normal Execution Schedule
House heater - Poor heat, adjust. Air conditioner - Poor heat, poor cooling, adjust. Refrigerator - Poor refrigeration. Commercial equipment - Adjust. Range - Pilot outage. Miscellaneous appliance (clothes dryers, incinerators, etc.) - Adjust. Turn on - Meter orders. Turn off - meter orders. Reset - Meter orders. Noisy meter.	Next working day or Customer's choice of future date.	Next working day or Customer's choice of future date.
Meter set (If project is involved where 5 or more orders are received, date for 3rd working day. Service Department will preinspect these and execute sets according to occupancy).	Before 12 Noon Next working day. After 12 Noon 1st preference - 2nd working day. 2nd preference - Next day.	Second working day.
Range - Adjust. Investigate routine parts replacement. Special reading or reread. A.I.S. meter order was C.G.I. Inspect for changing location of meter.	Second working day or Customer's choice of future date.	Second working day.
Disconnect and/or reconnect appliances. Convert appliance.	Check with M & J Dispatcher for exact date.	Third working day.

FIG. 2.

Order Execution Schedule

Type of Order	Monday - Friday Incl. Normal Execution Schedule	Saturday, Sunday and Holiday Normal Execution Schedule
House heater - Clean (left on). Refrigerator - Clean (left on). House heater - Turn on. House heater - Turn off. Air conditioner - Seasonal inspection. Commercial inspections - voluntary. A.I.S. meter order. Remove meter. Verify house number, meter number, etc. High bill investigate (5). Decrease in consumption. Locate and stencil.	Second working day if appointment is to be made with customer. If appointment is made with customer no execution date should appear on the order. These orders will be dispatched as fill in. The number of days in parentheses indicate the maximum of calendar days Service Department will hold order before dispatching it, when no appointment is indicated.	Second working day if appointment is to be made with customer. If no appointment is made with customer no execution date should appear on the order. These orders will be dispatched as fill in. The number of days in parentheses indicate the maximum of calendar days Service Department will hold order before dispatching it, when no appointment is indicated.

Note: The above excludes special cases involving public health and safety. For these, the judgment of those taking the orders shall govern. Also, except for emergency orders, this schedule may be varied at the discretion of the Supervisor of Dispatch to meet extreme changes in the work load.

FIG. 3.

signed to service commercial cooking equipment in hotels, restaurants, etc., also on the midnight-8:00 a.m. shift. Loading of meters and other materials is done from midnight to 8:00 a.m. at the substations and the main location.

Typical schedule, excluding assistant servicemen, for a weekday during mid-winter would appear as:

	Number of Men Assigned
8:00 a.m.-4:30 p.m. shift..	241
Off each day for working weekends	29
2:00 p.m.-10:30 p.m. shift..	31
4:00 p.m.-12:30 p.m. shift	15
Midnight-8:00 a.m. shift....	9

Assignment to night work is for a schedule period of four weeks.

Saturday and/or Sunday work is scheduled on one-week basis.

All-night and weekend assignments are rotated within different classifications.

Order Execution Schedule

Although problems concerning the order execution schedule are not the responsibility of the service department, they greatly affect the operations of dispatching as the schedule itself is part of the company's customer service policy. The service department collaborated with the telephone service in preparing an order execution schedule.

The initial schedule makes practically all customer-originated orders *dated orders*. It has been found that this policy does not give the service department sufficient flexibility required in its operation. Servicemen leaving with an estimated full day's work of all dated orders that are really appointment orders for that day, may be unable to complete all of their work. When such situations arise, servicemen are advised by the dispatchers as to whether they are to continue on to complete the assignments or to return the unfinished work. Orders that are returned are then redispatched to the night men. Delay of executing the orders plus placing an additional work load on the night force has resulted in an unfavorable dispatch problem. The returned orders are appropriately described as *Did Not Get To* orders. For this reason, the order execution schedule has been revised so that certain appliance adjust or check orders are taken as *By* on the third working day. The *By* means that the order can be worked from the time the order is written up to and including the third working day. If the order is not completed prior to the *By* date noted, it becomes a dated order.

Information received from foremen advises the dispatch group of those servicemen who, when loaded with an estimated full day's work, are to be

FIG. 4. General dispatch room.

FIG. 5. General dispatch room showing where orders are counted and processed.

given the *By* orders. Servicemen so loaded are instructed to work all the dated orders first, and then continue (if time permits) with the *By* orders. Most servicemen given *By* orders are inexperienced servicemen or those servicemen whose physical conditions are such that they are unable to keep pace with the group.

The large number of house heating customers (approximately 200,000) results in wide variations in work load depending primarily on weather. Unfortunately, the order execution schedule is somewhat limited in coping with these abnormal conditions. Large numbers of "No Heat" orders, which predominate during this period, must consequently be worked on overtime. Delaying other types of orders gives some relief in the work load but since the total of such orders is relatively small, expending considerable overtime during winter months is the present method of keeping up with incoming orders.

In mild weather, the order execution schedule is altered to balance work load and available manpower.

Preventing repeat service calls on the same appliance is an important function in the taking of orders. A "repeat" order procedure does much to accomplish this. When a customer calls, the telephone service man inquires if any previous service calls on the appliance were made recently. If the answer is "yes," an **R** in red is noted on the order. The order then goes into dispatch in the normal manner. The **R** on the order is a flag to the serviceman to give it somewhat more careful attention.

The completed order is returned. When it is to be filled, a clerk, noting the **R** on the order, searches the file to see if there are any other **R** orders on the same address. If there are, the clerk pulls all related orders and sends them to the foreman responsible for that area. The foreman reviews the orders and determines what action is to be taken. The foreman may decide to visit the job himself or he may feel the second call was in no way related with the first and no further action is required.

If there is no indication on the order that it is a repeat call and the serviceman, while on the premises, learns from the customer that other calls have been made recently on the same appliance, the serviceman places an **R** on the face of the order. The order is then treated and processed as a regular **R** order.

The above *repeat* order procedure permits not more than two orders being taken for an appliance without receiving the special attention of a foreman.

Route System

For dispatch and supervisory purposes, the system is divided into 103 service routes. Boundaries for these routes were established, not by geographical scale, but by work load areas. Each route normally averages a sufficient number of orders per day to keep one man busy within the area on practically every day of the year. During peak winter conditions, the work load within an area may increase to a point where a second or even a third serviceman may be assigned to a route to handle all of the work therein. During spring when work is light, one man may be assigned to cover two routes.

Since the service routes were determined by work load areas, the routes are unequal in size. Those in the suburban areas are rather large compared to the service routes within the district proper. Concentration of population is responsible for this. The large number of apartment buildings and row houses in the city results in relatively small service routes. Thinly populated areas with the scattered developments common to suburbs result in service routes of comparatively large areas.

Each foreman is responsible for an area that envelopes approximately seven service routes. Each foreman selects the servicemen to be permanently assigned to the service routes in his area. Servicemen assigned to regular routes operate in vehicles without radios. In addition to the seven regular service routes, each foreman has an average of two servicemen in radio equipped vehicles to cover his area. Also, one or two special servicemen are assigned to each foreman's area depending on the number of so called "special" pieces of equipment in that area.

Of a total of approximately 18 serviceman assigned to a foreman, about 10 are assigned to the same route day after day. The other eight are "extras" to be used as replacements for any of the servicemen assigned to regular service routes that may be assigned off for weekend work or for other reasons. The "extra" men are also assigned to the extra routes when the work load is such that more than one serviceman is required on a particular service route. During extreme conditions, it is not uncommon to have as many as four or five servicemen working in a few of the routes.

In assigning servicemen, every effort is made to keep the serviceman within his foreman's area. There are, however, occasions when this is not practical. At such times, the servicemen are moved to the routes as required.

The numbering of the service routes is somewhat odd. This is done for good reasons. The area served by the Washington Gas Light Company covers three different territories—the District of Columbia, Virginia, and Maryland. To allocate costs, the number of orders completed in each territory must be counted separately. For this reason, the routes in the District of Columbia are number 1 through 71. Those in

INCOMING ORDER COUNT - TODAY

Date _____

	LEAKS	HOUSE ADJUSTS	HEATING TURN ON/OFF	APPL. ADJUSTS PROVES	COMM. APPL. AIR COND.	HIGH BILLS	SETS	TURN-ON RESETS	STATE-ON	TURN-OFF REMOVE	TOTAL
12 M	2										
	1										
10 PM	2										
	1										
8 PM	2										
	1										
7 PM	2										
	1										
11 AM	2										
	1										
10 AM	2										
	1										
9 AM	2										
	1										
8 AM	2										
	1										
Total Rec'd. This Date	2										
	1										
Total Rec'd. Previous Date	2										
	1										
TOTAL	2										
	1										

FIG. 6.

FIG. 7. Order rack in general dispatch room.

Virginia are in the 100 series while those in Maryland are in the 300 series.

Dispatch—Organization and Layout

Organization of the service department dispatch is rather simple. It consists of two groups: The dispatch group proper, plus a scheduling and assignment group. The entire operation is headed by a supervisor of dispatching.

The scheduling and assignment group consists of three staff assistants. Their duties are:

1. Make up weekend, night, and holiday schedules.
2. Assign men to service routes and vehicles.
3. Administer overtime plans.

The dispatch group proper is responsible for the processing and dispatching of all orders to be executed by the service department. Fifteen dispatchers plus a varying number of clerks make up this group. On an average winter day, a typical week day schedule would include:

Shift	*No. of Dispatchers Assigned*	*No. of Clerks Assigned*
8:00 a.m.-4:30 p.m.	8	10
4:00 p.m.-12:30 a.m.	3	5
12:00 midnight-8:00 a.m.	3	1

One dispatcher would be scheduled "off" each day for working the weekend.

All dispatchers and staff assistants are confidential as non-union grade employees.

Work done on the three different shifts is as follows:

On the 8:00 a.m.-4:30 p.m. shift, incoming orders are processed and counted for dispatching. Work to go out that day is dispatched to men in the field via radio and telephone.

The 4:00 p.m.-12:30 a.m. shift matches and sorts completed work. Processing and counting of incoming orders is continued. Orders are also dispatched for execution by the night men.

Three dispatchers and clerk on the midnight-8:00 a.m. shift make up the work routes for the servicemen who report at 8:00 a.m.

Physical layout of dispatch consists of three sections—the offices of the dispatch supervisor and the scheduling and assignment group, the *general* dispatch room, and the *today* dispatch room.

Telephone and radio facilities are duplicated in both the general and the today dispatch rooms. This permits dispatching of orders to the servicemen from either or both of the dispatch rooms. In normal operations, the *today* room is used from 8:00 a.m. to 12:00 midnight, Monday through Saturday. From midnight to 8:00 a.m., all dispatching is handled from the *general* dispatch room. On Sundays, the *today* room is used only from 8:00 a.m. to 4:30 p.m., after which all dispatching is done from the *general* dispatch room.

A small section of the general dispatch room is reserved for the repair parts section of dispatching. Only one dispatcher and a clerk are assigned to this phase as the amount of repair work performed is limited. An average of six servicemen is assigned to appliance repairs daily.

General Dispatch Room

Work performed in the general dispatch room consists primarily of counting and processing of all orders prior to dispatching. The processing of orders involves:

1. Noting service route number on each order according to the geographical location of the address.
2. Segregating and counting orders by date of execution.
3. Coding the "special" types of orders.

At present, the noting of service route numbers on orders is dependent on the knowledge of the dispatchers. These men, with their years of experience, know practically every street and subdivision in the system. By simply looking at an address, they can, in most cases, locate it by service route.

With a rapidly expanding system, however, it is becoming more difficult to keep up with the many new streets and subdivisions. Costly errors can occur. Wrong service route numbers on an order may take the serviceman miles out of his way.

A comprehensive street index of the entire system aids dispatchers and servicemen in locating addresses by route number. The index also includes a grid system for aiding in the location of streets and subdivisions.

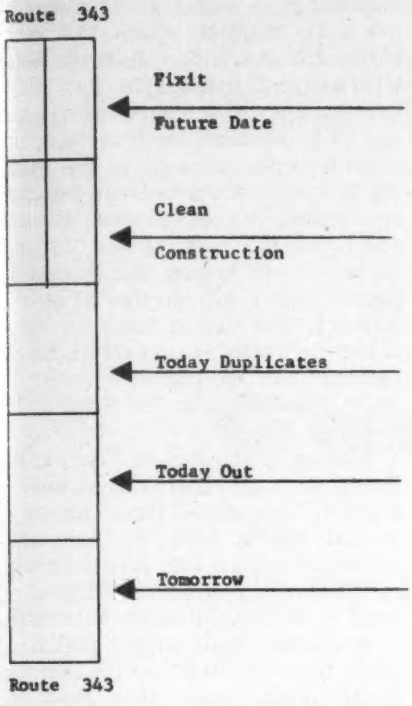

FIG. 8.

Counting incoming orders by types and dates is probably the most important operation in the dispatching of service work. Without this information, it would be impossible to determine manpower requirements.

The count of *today* orders, where hourly information is imperative, is maintained on the form *Incoming Order Count — Today*. Carrying the same basic information, though less detailed, is a companion form, *Incoming Order Count—Future Date*, which has four successively dated sections for recording orders for the four succeeding days. Thus, a five-day picture of incoming orders is on hand at all times. Although very few orders are received beyond the fifth day, orders for a particular day, regardless of how far in advance, are properly recorded for the date of execution. This is accomplished by dating the future date forms many months in advance. If an order is received on January 1 for execution on March 2, the disptcher leafs through the date count sheets until March 2 appears and notes the order thereon.

Count sheets are divided into columns of the more common types of service orders. The purpose of this is not only to determine how many of these orders are received, but also to determine manpower requirements. There is a big difference in time it takes to complete a house heating adjust order compared to an order calling for the setting of a 5-lt. meter.

For the counting of orders and also for manpower requirements, the system is divided into two separate areas. These are designated by numbers 1 and 2 on the left side of each of the incoming order count forms. The District of Columbia and Maryland are combined and represented by No. 1. No. 2 represents the Virginia area.

This is because the areas served by the main district station and the Maryland substation overlap. There is no working boundary between the two stations. For the Virginia area, the Potomac River is a natural working boundary. There are only three bridges over the river, making most of the Virginia service routes too distant from the district station.

Information on the two order count forms is also used in accumulating statistics for telephone service. For this reason, the sections *Total Received This Date* appear on the count sheets.

Actual counting of the *today* orders and orders dated for the next day is performed on mechanical counters. Beyond the next day, orders are counted manually.

From past experience, the pattern of incoming orders taken for a particular day during winter months has been:

Received same day	40%
Received day before	45%
Received two days before	10%
Received three days and prior	5%

Average number of orders received per day during this period was 2400.

After the orders are counted, those considered *special* are coded by placing a colored plastic tab on edge of order. Different colored tabs denote the different types of orders. For example, a red tab indicates it is an order that can only be given to a special serviceman. A green colored tab signifies it is a *clean* order and is to be dispatched to a serviceman equipped with a vacuum cleaner.

If an order is dated for a future date, it remains in the general dispatch room. If it is a *today* order, it goes directly into the *today* dispatch room.

All orders are taken in duplicate. If an order is dispatched from the office, the serviceman takes the original with him for completion. The duplicate remains in the general dispatch room. If an order is dispatched via radio or telephone, the serviceman makes out a "field" order. The original and the duplicate of the office copy is sent to the general dispatch room.

To answer inquiries and facilitate making up work routes for the next day, a five-tier rack is used for storing orders and duplicates of orders. Fig. 7 shows a section of this rack.

The pigeon holes are numbered according to service routes. Each route takes in all the pigeon holes from top to bottom for that particular number.

A simplified drawing of just one route is shown in Fig. 8.

The various pigeon holes for a given route are utilized as follows:

Starting at top, the first pigeon hole is headed **Fixit—Future Date.** All future date orders beyond the next day for that particular route are stored here

FIG. 9. Today dispatch room — clerk's side.

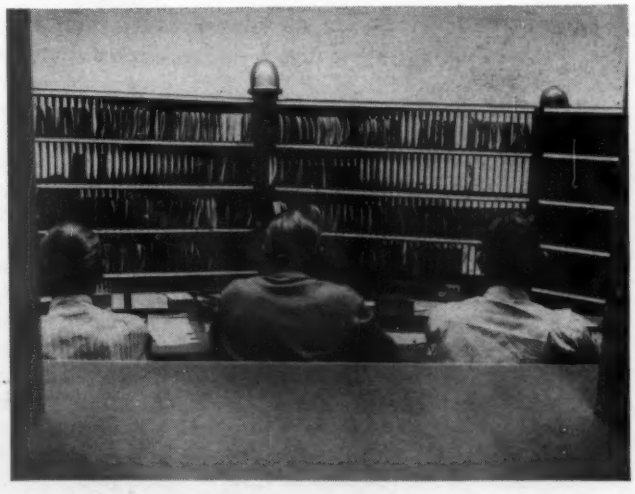

FIG. 10. Today dispatch room — dispatcher's side.

until day prior to date of execution. Each day, these orders are examined and any dated for next day are then transferred from the top bin to the one at the bottom, marked **Tomorrow.** Duplicates of meter orders returned and marked "C.G.I." (Couldn't Get In) and the original are kept here. A *Mr. Fixit* in telephone service makes arrangement for completion of the order. When this is done, the original and duplicate are rematched and the order becomes a dated one.

The second pigeon hole from the top is headed **Clean—Cons.** Two types of *special* orders are kept here for that particular route. These orders are undated and can be dispatched as work load permits. The clean orders are dispatched to men with vacuum cleaners. The *Cons* is an abbreviation for construction work that requires special tools and equipment. This work also involves assignment to larger trucks stocked and equipped to do a variety of pipe fitting work.

The third bin from the top is headed **Today Dup.** Duplicates of orders — whose originals are still in the *today* dispatch room waiting to be dispatched —are placed here.

The fourth bin is headed **Out.** Duplicates of the orders in the field with a serviceman are stored here. Originals of orders dispatched by telephone or radio for that particular route are placed in this location.

At the bottom is a bin headed **Tomorrow.** All work dated for the next day for that route is placed here. Dispatchers on the midnight-8:00 a.m. shift take the orders from the bottom row of pigeon holes and make up work routes for servicemen reporting at 8:00 a.m.

By this arrangement, an order can quickly be located and information on its status be given. Should a customer's man call about a particular order, the clerk would first determine what service route it is in. He would then look in the **Out** bin for that particular route. If he finds the duplicate or the original of the order in this location, he knows the order has been dispatched to a serviceman.

If he fails to locate the order in the **Out** bin, he next looks in the **Today—Dup.** If the duplicate of the order is found here, the original is still in the *today* dispatch room waiting to be dispatched.

Should the clerk fail to locate the order in either the **Out** or **Today—Dup** bins, he then looks in the others to determine whether or not an order has been received. Failing to locate the order in any of the pigeon holes, the clerk would inform the customer's man that dispatch has not received an order for that address.

Another important function is also performed by the dispatchers and clerks of the general dispatch room. At the end of the various shifts, all work is returned to this location. Meter orders are matched with corresponding duplicates. Leak orders are also matched with duplicates. Main purpose of this procedure is to account for all meter orders and leak orders to insure against possible loss.

Appliance orders are separated as to whether or not they have been completed. Completed appliance orders are not matched with their duplicates. They are later sorted by territories and then sent to the clerical group to be filed.

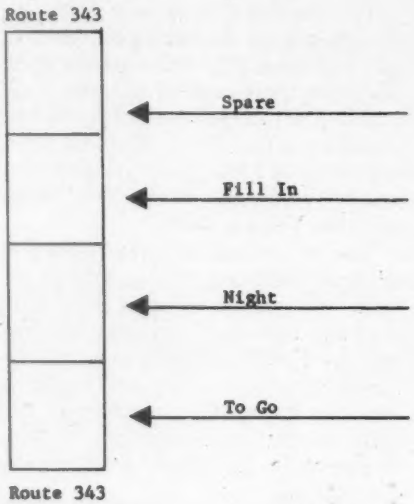

FIG. 11.

Incomplete appliance orders are matched with duplicates and processed further.

Today Dispatch

The *today* dispatch room is primarily concerned with dispatching additional work to servicemen already in the field. All telephone and radio contacts with servicemen are made from this room during the hours of 8:00 a.m. to midnight.

During winter months, three dispatchers and seven or eight clerks are required to handle the work load during peak hours.

Fig. 9 and 10 show the general layout of the room. The clerks man the positions on the outside of the curved table with the dispatchers stationed on the inside. Each position has a telephone box with 10 outside lines coming into it. There is a radio hand microphone and speaker for every other position on the clerks' side of the table. One radio speaker and three hand microphones are located on the dispatchers' side of the table. Radio equipment can be operated by either the clerks or dispatchers.

During peak operations, the radio is operated from a desk in the corner of the *today* dispatch room. The main reason for this is to reduce the noise level of the dispatch table.

After the *today* orders are counted and route numbers noted thereon, the original copies are sent to the *today* dispatch room. Duplicates are detached and remain in the *general* dispatch room. In the *today* room, original copies of the orders are placed in pigeon holes similar to that of *general* dispatch. The rack in the *today* room is four tiers high. Fig. 11 shows the arrangement of the pigeon holes in the *today* dispatch room for a particular route.

Starting at the top of Fig. 11, the first pigeon hole is untitled and used as a spare. The second from the top is headed **Fill-In.** Undated company-originated work is kept here to be used as fill-in when customer-originated work is lacking. Often, at the moment a serviceman calls in for additional work, there are no orders for that particular route. Rather than move the serviceman out of his route, fill-in work is given to him. The fill-in work consists primarily of changing meters for age, removal of inactive meters, and investigation of either high or low consumption.

Third pigeon hole from the top is titled **Night.** Any *today* orders that are marked for execution after 4:00 p.m. are placed here. This is to prevent accidental dispatching of the order prior to time noted on order.

The bottom bin is headed **To-Go.** All *today* orders other than the after hours are placed here for dispatching.

Leak and other urgent orders are normally placed directly in front of the dispatchers rather than in pigeon holes.

Normal method of operation is as follows:

The serviceman calls on any one of the 10 outside telephone lines. A clerk answers the phone. By means of a small printed form, described later, the clerk relays the information to the dispatcher. Dispatcher then determines what and how much additional work is to be given to the serviceman. Additional orders are given to the clerk who, in turn, relays them to the serviceman on the telephone. The actual "loading" or giving to the servicemen this additional work is covered later.

As previously stated, the *today* dispatch room is only concerned with dispatching work to servicemen in the field. No calls except those from servicemen are permitted to enter this room. Once an order is dispached in the *today* room, it is then send out to the *general* dispatch room, where it is placed in the appropriate pigeon hole according to service route.

Gas Calorimetry

Part 3 – Net Heating and Inferential-Type Calorimeters

ANOTHER CLASS OF CALORIMETERS includes those that indicate net heating value. This fact is probably the most important difference between this classification and the class discussed in the previous chapter. In many cases the instruments that indicate net heating value are calibrated to give results in total heating value. A wide variety of this type has been made employing different methods of response to gas heating value. Two of the more important in use will be discussed.

Thermeter

The *thermeter* is a modification of the calorimeter of the Cutler-Hammer type. The principle is basically the same. Fig. 8 shows that it consists of two parts, a recorder giving an indication and record of the gas heating value, and a tank unit where the measurement is made. A flow diagram is shown in Fig. 9.

This diagram shows that the determination does not involve a separate supply of heat absorbing air. The air meter delivers a large quantity of air to the burner to support combustion of the sample and provides an excess which is later mixed with the products of combustion. Thus, the heat liberated from the combustion of the gas sample is imparted to the mixture of air and flue products. The temperature of this mixture is sufficiently high so that none of the water formed in combustion is condensed. Changes in gas composition can cause a variation in the specific heat of the flue products. Thus, the thermeter records an indication that is more nearly a function of net heating value than total heating value.

Temperature rise is determined by means of a thermocouple and recorded by a self-balancing potentiometer. Compensation for a decrease in potential generated by the thermocouple, caused by tank temperature effects on the temperature rise, is accomplished by decreasing the current flow through the measuring portion of the recording potentiometer circuit. It is done by a positive temperature coefficient of resistance thermometer located in the tank water, connected in the circuit so that it will not interfere with standardization of the potentiometer against the standard cell.

Although the determination is more nearly a function of net heating value, the thermeter is calibrated to give results in total heating value per standard cubic foot. The recorder circuit must be designed and adjusted to suit the composition of the gas which is to be tested. Actual calibration consists of operating the instrument on pure hydrogen and adjusting the recorder to read a theoretical value that will give correct results on the test gas. Data in Fig. 2 showing the variation in net heating value and ratio of net to total heating value in terms of gas composition, indicates that a separate hydrogen test value is required for each gas. The instrument can also be calibrated to give results in net heating value.

The recorder range is of the suppressed zero type.

FIG. 8. Thermeter.

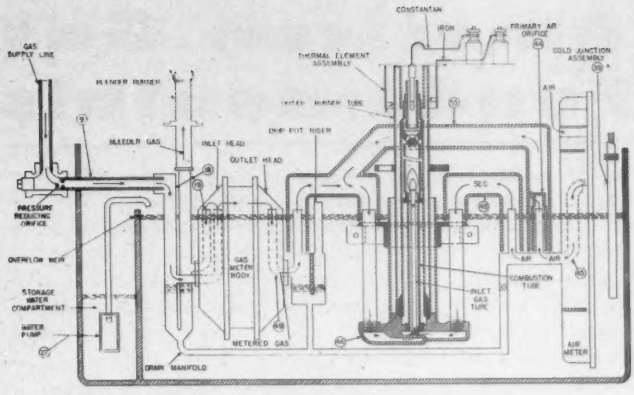

FIG. 9. Flow diagram of thermeter.

No zero is required for test or calibration. Thus, scale and chart range are from 50 to 100 percent of the full scale range of the instrument. In the case of a 600 range unit, the scale and chart will show readings from 300 to 600. Ranges cover all of the gases normally used commercially.

No special skill is required for operation and maintenance. A simple daily routine — changing chart and standardizing the current in the potentiometer — is required. The reserve tank water must be periodically replenished to maintain an adequate supply. About every three or four months a hydrogen standardization test should be made.

Installation requirements are similar to those for the recording calorimeter but are not as important because it is not possible to secure equivalent accuracy. With care, results within 1 to 2 percent of the correct heating value can be attained and maintained.

The indication and record are directed at the designed basis of measurement and no corrections or calculations are required. The speed of response of the thermeter is very good. For example, a 1200 range model will require about 50 seconds for the instrument to start to show a change. Eighty percent of the change will be shown in about 4 minutes.

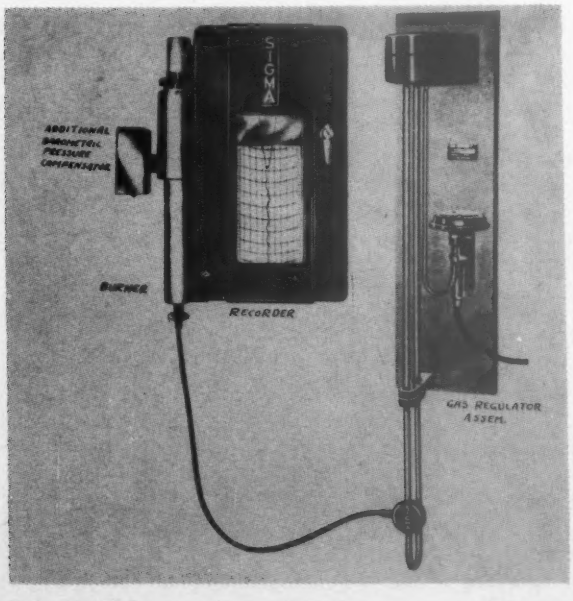

FIG. 10. Sigma recording calorimeter.

Sigma Calorimeter

This instrument employs the principle of heating value being directly related to the differential expansion of two tubes in the products of combustion. It consists of two parts shown in Fig. 10; the gas flow regulator on the right, and the gas burner and recorder unit on the left.

Gas to be tested is burned at the bottom of two concentric steel tubes, the products of combustion setting up a differential expansion between them. The two tubes are rigidly connected at their lower end. The upper end of the outer tube is fixed to the instrument case, and the upper end of the inner tube is fixed to the magnifying mechanism which drives the pen providing the chart record.

The differential expansion of the two tubes is related to the heating value of the gas burned so that the chart record can be made in terms of Btu. Actually, since only a portion of the heat of combustion of the gas is measured (the latent heat of vaporization of water vapor formed in combustion is not recovered since the products escape at high temperature), this indication is more nearly related to net heating value. Thus, the instrument must be empirically calibrated in total heating value.

The reading is kept independent of changes in the specific gravity of the gas and in atmospheric pressure and temperature by means of the special governor and orifice assembly shown on the right side of the figure. Variations in the ambient conditions affect the governors of the assembly differentially and cause a change in the pressure difference across the gas flow orifice. The gas flow is thus adjusted to deliver approximately a constant mass to the burner. A modification of the instrument is available in which an additional barometric pressure compensator has been added. This is used only on gases where heating value variations are limited; i.e., on a gas of rather constant heating value.

Calibration can be accomplished by setting the instrument to agree with a more precise manual flow calorimeter or recording calorimeter. An alternate method is to check the reading on a gas of known heating value. However, because the indication is a function of net heating value, this method requires the standard gas to be essentially of the same constituents, specific gravity, etc., as the test gas. Otherwise, errors will be calibrated into the net results.

A wide variety of ranges are available so that applications to gases from blast furnace to butane vapor are indicated.

Installation requirements are most important. The location should be free of drafts and any possibility of sudden changes in ambient temperature. The room must have sufficient ceiling height to avoid any temperature difference, between the top and bottom of the gas flow regulating equipment assembly. Stratification in temperature at the instrument may cause errors in the indication.

As a result of these characteristics, it appears that the probable errors are about 2 percent.

The speed of response to change in heating value is not high. For example, in operation on a gas of approximately 470 Btu it takes about 3½ minutes to start to show the change and approximately 15 minutes to approach the final value.

The Sigma calorimeter has the advantages of simplicity and ease of maintenance.

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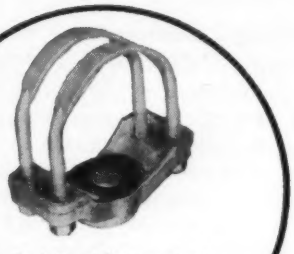

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Parr Calorimeter

The third major classification of calorimeters is the inferential type.

This category includes the comparison type, of which the *Parr* is an example. In this calorimeter, the comparison of heating values is made by comparing the rise in temperature in nearly identical calorimeters. In one, the gas to be tested is burned, and in the other, an equal volume or multiple of volume of the known gas is burned. The gases are displaced under the same pressure from cylinders kept at the same temperature. The two volumes are chosen so that very nearly equal temperature rise will occur in the two calorimeters.

Obviously, the quantity being measured is the ratio of the heating value of the test gas to the standard gas. Thus, the actual heating value of the test gas for a given set of conditions is calculated by multiplying the heating value of the standard gas at the desired basis of measurement by the observed ratio.

A diagram of the Parr gas calorimeter is shown in Fig. 11. Tests on the instrument, even when observations were made with the greatest care, indicated that the precision of a single determination might not be very great. The time required was about the same as that for the manual water flow calorimeter.

Caloroptic Calorimeter

Operation of this instrument is based on the regulation of the primary air supply of a Bunsen type burner to give perfect combustion. Size of the primary air opening required for perfect combustion is translated into Btu values, which are read directly on the burner tube and the adjustable sleeve, marked with micrometer-like graduations, by which the size of the opening is changed. Constant pressure of the gas sample is established by an adjustable spring-loaded regulator.

A typical instrument that has been modified as a controller is shown in Fig. 12. Actually, this type could be classified as an inferential type calorimeter in which a visual observation of the flame is the principle of operation. Results from this device will be affected by the visual evaluation of the flame made by the user, gas composition and density, variations in temperature and pressure of the gas, and changes in conditions surrounding the instrument. Simplicity and short time lag are its chief advantages.

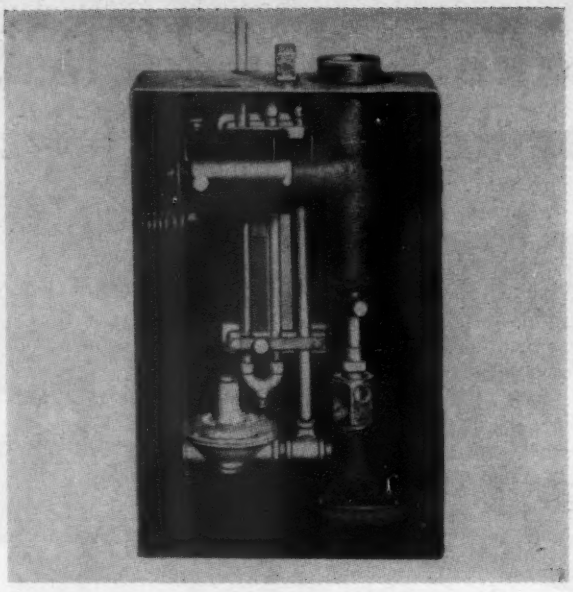

FIG. 12. Caloroptic calorimeter.

Gas Analysis

Gas analysis equipment cannot be classed as a gas calorimeter. However, it can be used in an inferential way to calculate heating value. If an accurate analysis of gas composition is available, it is possible to calculate the sample heating value from the percentage by volume of each constituent present and the heating value of the pure gas constituent in Btu per cubic foot.

Two sources of error are fundamental in any determination of this type. First, the accuracy with which the volume percentage of each constituent can be determined; and, second, the accuracy of the values assigned as the heating value of the pure constituent. In the precise determination of heating value, the uncertainty in the heating value of the pure gas can be important.

One method of gas analysis widely used is the absorption method. This involves the successive measurement of changes in gas volume produced by treating an original mixture of gases with suitable chemical absorbents and by subjecting the remainder to combustion with oxygen or air. Measurements are made on a volume basis, the procedure is called volumetric gas analysis and the results are usually expressed by volume.

The procedure is based on successive measurements of contraction. Therefore, temperature and pressure must be controlled in order to avoid error. A difference of 5 F during analysis would make a difference of over 1 percent in the volume. The water vapor pressure will also change, causing an additional error. A pressure change of 0.1-in. mercury would change the volume of gas by one-third of 1 percent. Other sources of error include the solubility of certain gases in the displacing and confining liquids and errors which may result from too rapid manipulation because time is necessary for the absorbing reagents to function properly.

The absorption type of apparatus will not separate quantitatively the homologous series of gases such as

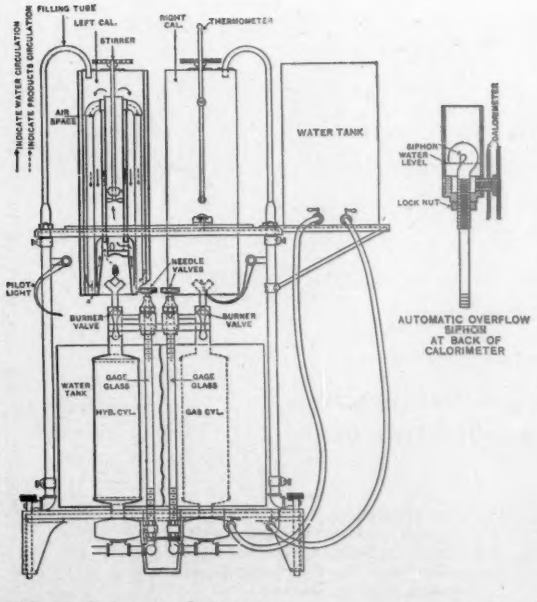

FIG. 11. Parr gas calorimeter.

ethane, propane, butane, or the similar unsaturated compounds.

This method can be used only for spot checks and considerable time is involved in a determination. Application is limited to laboratory work.

Mass Spectrometer

This instrument permits a highly precise determination of the constituents of a given gas sample. From the analysis, the heating value of the sample can be calculated by using the corresponding heating values of each of the pure gases indicated.

In the mass spectrometer, molecular masses are separated by virtue of difference in their momenta when all have been given an identical kinetic energy in a given direction. Four steps are involved in the separation. First, the molecules are given a positive charge. Second, the ions are given an identical kinetic energy along a given path by a potential difference between two accelerating slits. Third, the ions are resolved in a uniform magnetic field by being deflected in arcs whose radii are proportional to their momenta. Fourth, the resolved ion beams are collected and recorded.

Errors in analysis enter from three different sources: First, the instrument; second, the sample, and third, the computations. In heating value determinations a further complication arises since the analysis is on the mole basis and variations from the ideal gas laws of the constituents of the gas cannot be readily taken into consideration.

This method of determining gas heating value involves the most complicated equipment and requires the services of highly skilled individuals for operation and analysis of the results. It probably also involves the longest time for a determination. Application is to check samples of gas only, and only in large research laboratories which have the properly trained personnel.

Specific Gravity Instruments

Actually, specific gravity instruments are not designed from the standpoint of attempting to determine gas heating value. However, in the case of certain binary mixtures, notably LPG-air mixtures, a determination of specific gravity of the mixture establishes the percentage of gas present. Obviously, this assumes the gas itself does not have more than one constituent and that its gravity is known. From the assumed known heating value of the gas and the percentage in the mixture, the heating value of the mixture can be calculated.

Use of this idea is limited to certain gas mixtures and the accuracy depends on a knowledge of both the specific gravity and heating value of the two constituents. In addition, it will be noted that small variations in specific gravity will correspond to rather large changes in heating value so that the accuracy requirements in the determination of specific gravity may be extremely high. For example, consider the following:

Propane-air mixture of 1400 Btu
(Propane of 2529 Btu has a Sp. Gr. = 1.527)

$2529\ X = 1400$
$X = 55.2\%$ propane
$1\text{-}X = 44.8\%$ air

Specific gravity then is $0.522 \times 1.527 = .844$
$0.448 \times 1.000 = .448$
1.292

Suppose the heating value of the mixture decreases 10 percent. Then the new mixture heating value is $1400 - 140 = 1260$ Btu and

$2529\ X = 1260$
$X = 49.9\%$ propane
$1\text{-}X = 50.1\%$ air

Specific gravity $= 0.499 \times 1.527 = .762$
$0.501 \times 1.000 = .501$
1.263

Change in specific gravity:

$$\frac{1.292 - 1.263}{1.292} = \frac{.029}{1.292} = 2.25\%$$

Thus, a 10 percent change in heating value corresponds to only a 2¼ percent change in specific gravity.

Part 4 of this article will appear in the next issue.

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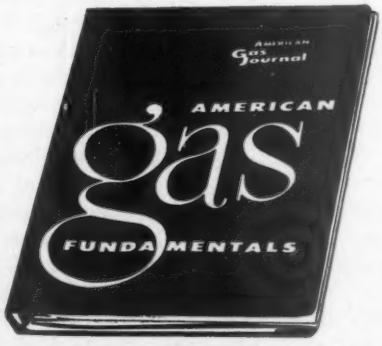

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Plagued by Pests?

Office Pests . . . How to Control Them

Ernest W. Fair

JUST as our home life is badly disrupted by pests — in this case insects and rodents — so our office life is continuously harassed and disrupted by pests of the human variety. And, just as there are effective pest control methods to handle the household pests, so there are control methods to successfully exterminate those which infest the office. Here are the more common types and suggestions for their control:

Pete the Peddler is a pest that will probably always be with us. Distinct from the supplier salesmen, he serves little useful purpose, and has nothing of real value to offer. Signs do not discourage him; hard looks are his meat. He disrupts employees' work, wastes their time, prevails on their sympathy, and pockets their pennies. The best formula to use on this individual is a little guile and deceit, i.e., inform him Mr. or Miss So-and-So handles all such matters and is out at present, or company policy prohibits individual employee contacts. An effective control can sometimes be achieved by an alert office receptionist.

Don the Juan is the variety who is convinced that he has irresistable charm that the receptionist and other women in the office must share and who not only annoys them continuously but disrupts office routine. Trying to handle this pest with kindness and good manners only encourages him in the certainty he has made another conquest. Sharp jibes and ridicule of his charms will prove much more effective. Sometimes, it is necessary for the personnel manager to suggest that he pay more attention to his job and less to his co-workers.

Betty the Borrower is another deadly inter-office pest that should be recognized early and discouraged forthwith, or all supplies and portable office equipment will be in her office before you realize what has happened. *Sure, be glad to let you use it here, but I have to use it myself in a little while,* is one way to discourage her. Another is to be always "out" or down to the last "two or three" of the requested item. Saying "no" and saying it from the very start is a sure way to discourage this individual, for if she cannot get results she will soon find another victim.

Tom the Telephoner exists in every major office set-up. Many a time an important call has been missed in the office while Tom argued with his girl, or a credit manager over your telephone. One polite way of saying no is *I'm sorry but our telephone is out of order,* and should it suddenly ring, coming back with *Oh, there it's fixed,* answering quickly and hanging on as long as possible. Another answer is: *"I'm so sorry but Mr. So-and-So has asked that there be no out-going calls for the next hour, he's expecting a very important call any minute.*

Peg the Postage Pest costs every office a sizable sum of money over a year's time with her petty filching of "just one stamp" mighty often. Not keeping stamps is of course the obvious answer. Not as drastic, but as effective is putting one person in charge of stamps and keeping track of outgoing mail is another answer. *Just leave the money with the letter at the mail room and they'll mail it for you at the post office when they go,* is the answer one office manager gives this type pest.

Gossipin' Gert is another breed of time killers that always leaves a bad taste in one's mouth after her visit. When such a pest has been recognized for the pest she is, you can always be too busy to listen, ignore her, or say you have already heard the news. Or, you can take the straight forward approach and tell her you prefer to mind your own business and would appreciate her doing likewise.

Louis the Lounger who decides that your office is a good place to loaf around, "shoot the breeze," spend a second, third or fourth coffee break, etc., is a pest of the more subtle kind. He disrupts your work, and is a bad influence on the other office personnel who have work to do. Seeing that such an individual is placed in the most uncomfortable chair available, is one tactic. Inviting him out for a cup of coffee and hurrying off before he can get his first sip is another way of detouring this pest. Making a telephone call or

two and paying no attention to him, suddenly remembering an appointment, or informing your secretary to bring a contract or special file in when he appears with *Here's the file you wanted Mr. So-and-So* are also effective ruses.

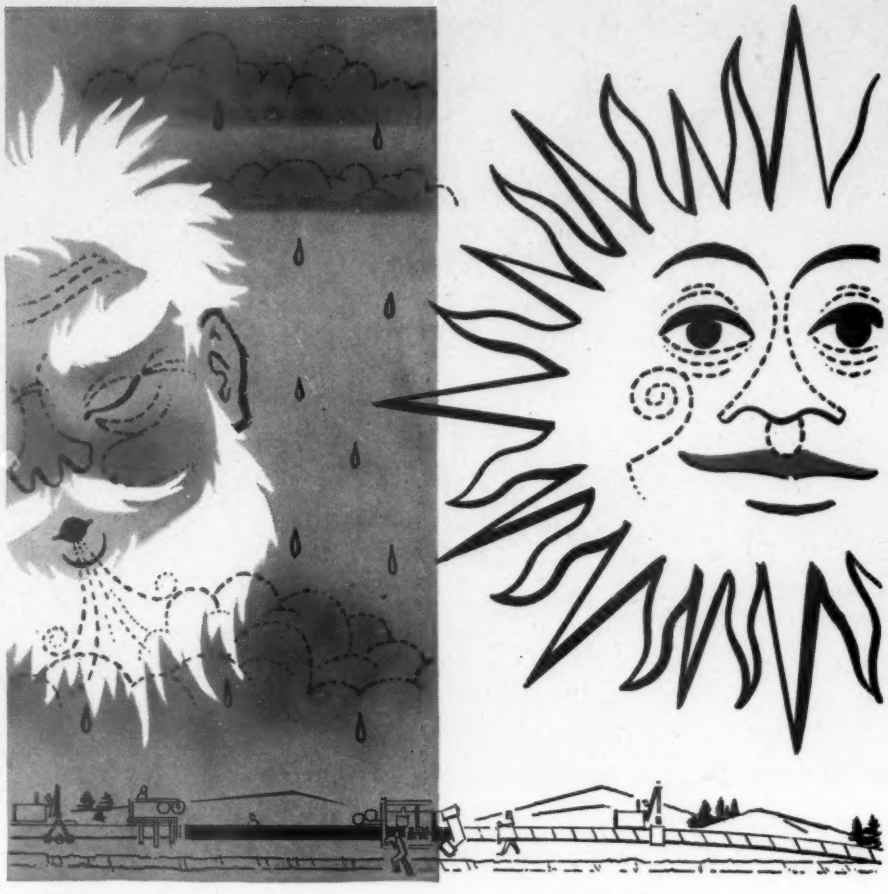
Clarence the (Self-Appointed) Crusader and his progeny seem to be on the prowl in every kind and type of office. With their portable soap boxes they descend upon you. They are usually difficult to handle and always unreasonable. *Mr. So-and-So sets aside Saturday mornings to see folks on such matters,* is one answer to give, or if they should come back then Mr. So-and-So can always be called away to the bedside of a sick aunt. If they decide to pour forth their message on the personnel, turning a deaf ear to them is about all we can do; most will soon go away when they lose their audience.

Freddy the Friend who has nothing better to do than hang around the office needs discouraging as much as any other pest; particularly the male variety seeking feminine companionship in the office. The best formula to exterminate the office of these pests has to be applied by the employees with whom they are visiting. When it is clear to such an employee that the office is a place to work, and visitors should be handled after office hours, then the individual employee can generally handle the problem and most certainly will handle it if he or she knows their very job depends upon getting rid of "Freddy" during office hours.

Elmer the Efficiency Expert who keeps coming into the office and showing everyone how to do something *better* is another pest of irksome caliber. Usually this Elmer is a rude individual and understands only rude treatment. Sometimes he is a mild-mannered *do 'em gooder.* In the latter case, if we will take the time to listen attentively two or three times, and then absolutely ignore the instructions we will discourage him. He thrives only on seeing someone else's system supplanted by his own, and will move to other "greener pastures" when he can't obtain results in your office.

Such pests as these have no place in any busy office. Not only do they disturb the established routine, but they are a constant source of friction, jangled nerves, and in the long run a very unnecessary item of office overhead.

Handling them with the "insecticides" will take care of the situation in nine cases out of ten. The tenth case will take some doing, i.e., individual handling of the individual problem; but it is worth all of the effort required to get the job done. * * *



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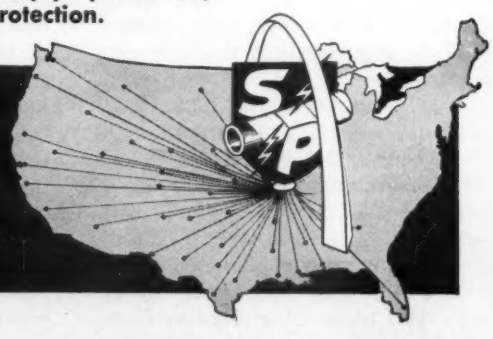

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Laying of a new 24-in. gas main under water in Berry's Creek, near Carlstadt, New Jersey, has been completed by Public Service Electric and Gas Company of New Jersey. The line, when fully installed, will extend from Moonachie Road, Carlstadt, to Chestnut Street, Passaic—a distance of more than five miles. The new 24-in. main will provide an additional gas supply to the Lodi, Garfield, and Wallington areas. The line under Berry's Creek was laid at an elevation 32 ft below sea level at low tide. The section from Washington Avenue, Carlstadt, where it ties into a 36-in. main to the Passaic River, Passaic, was placed in service in December.

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Baltimore Gas and Electric Company, Baltimore, Maryland, has a number of projects planned for 1958 in its service area. South of Baltimore, company plans 27,500 ft of 12-in. high-pressure main, costing $312,000, which will be contracted. Southwest of Baltimore, 8500 ft of 6-in. high-pressure main is planned, at cost of $50,000, to be contracted. Within Baltimore, 5000 ft of 12-in. high-pressure main is proposed, at cost of $63,000, to be contracted. Northwest of Baltimore, 9400 ft of 6-in., and west of Baltimore, 2200 ft of 12-in. and 3300 ft of 6-in., all high-pressure main, will be built, at total cost of $122,000, jobs to be contracted. At Annapolis, 3150 ft of 6-in. high-pressure main is planned, at cost of $29,000, with contractor to do work. Also to be contracted in Baltimore are 44,000 ft of 26-in. high-pressure line, to be built at estimated cost of $1,075,000. In Baltimore and surrounding areas, company forces and contractors during 1958 will install some 528,000 ft of various size pipe in routine extensions relative to new business, with cost of these installations estimated at approximately $2,016,000.

Western Kentucky Gas Company, Owensboro, Kentucky, plans installation during 1958 of some 327,000 ft of new mains, part of normal expansion of facilities at various locations in its service area, which includes 55 communities in western Kentucky. Miscellaneous small projects are to be handled by company personnel, with other work to be contracted. In its low-pressure distribution main systems, company will install 3900 ft of 2-in., 1700 ft of 3-in., 10,000 ft of 4-in., 3000 ft of 6-in., and 400 ft of 8-in. In its intermediate pressure distribution main systems, company will install 156,000 ft of 2-in., 9800 ft of 3-in., 74,000 ft of 4-in., 6700 ft of 6-in., and 900 ft of 8-in. In its high-pressure systems, company will install 14,400 ft of 3-in., 41,000 ft of 4-in. and 5200 ft of 6-in.

Laclede Gas Company, St. Louis, Missouri, has construction plans for 1958 that include completion of 11,575 ft of 20-in. feeder pressure main that will provide a second feed to and from its underground gas storage field. Work on this project began in November. Company crews are making installation. Construction is planned to begin in April on 15,000 ft of 16-in. and 19,600 ft of 12-in. main extension that will provide service to new Chrysler Corporation plant to be built in Laclede's service area. Company personnel will handle this installation.

Harlan Muncipal Gas Utility, Harlan, Iowa, has completed installation of 1176 ft of 2-in. intermediate pressure main extension to service a new residential development. Utility has also completed 3500 ft of 1 and 1½-in.

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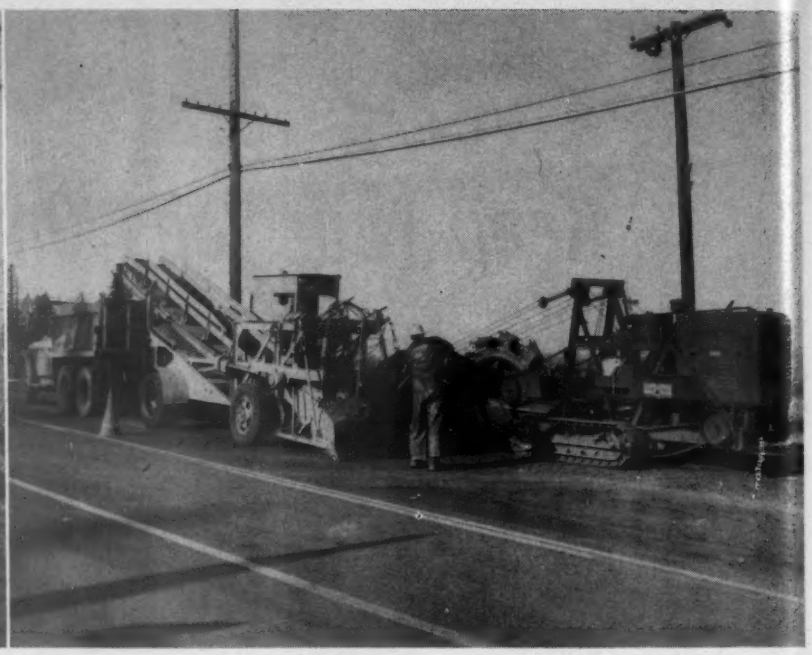
Welders at work on section of 8½-mile line laid by Portland Gas & Coke Company just east of Portland, to serve Reynolds Metals company's aluminum smelting plant at Troutdale and provide new feeder to serve eastside suburbs. Line is 8 and 10-in. pre-wrapped. Welding rig is mounted on pickup truck. Handling pipe beyond pickup, is crawler tractor with side-boom attachment.



Neat manner in which contractor removed dirt from ditch as required on route of line by Oregon highway department is shown above. The trencher dumped dirt into hopper on loader which in turn loaded 10-yd truck. Six trucks were used. Contractor devised hopper behind scraper on the loader unit. Contractor estimated that this system improved efficiency by as much as 30 to 40 percent, especially during rainy period. For back-filling, the pipe was packed in sand and clay, and all above that in the 12-in. wide ditch was gravel, as required by the state to protect the highway shoulder. A hydraulic tamper with 22-ton impact on a 14-in. sq tamping head more than met the 90 percent impaction requirement.

service installations, intermediate pressure, in its service area. All work was performed by utility's personnel.

Union Gas System, Inc., Independence, Kansas, has numerous projects underway or soon to begin and scheduled for completion during the summer of 1958. This includes installation of 3075 ft of 3-in. and 1050 ft of 2-in. intermediate pressure distribution main and a town border metering station at Skiatook, Oklahoma; installation of 47,000 ft of 2 to 10-in. distribution mains — new and replacements — in Coffeyville, Kansas; 2200 ft of 10 and 12-in. high-pressure line adjacent to Coffeyville; installation of 1000 ft of 6-in. high-pressure line replacement in Nowata County; installation of 7350 ft of 2 to 6-in. distribution mains in Fredonia, Kansas; construction of 10,750 ft of 2 to 6-in. distribution main in Independence; installation of 12,500 ft of 2-in. replacements on secondary road projects; 8000 ft of 2 to 6-in. mains to be installed at Olathe, Kansas, including replacements, and 78,500 ft of 2 to 6-in. distribution main installations, including replacements and extensions in Wyandotte County. Company crews do all work except some major projects.

Electronic pipe locator is used by personnel from the Aurora operating department of Northern Illinois Gas Company. Instrument consists of a radio signal transmitter and a receiver. Because the signals follow the path of least resistance, such as a metal pipe, the receiver picks up the loudest signals when it is nearest to the gas main.

San Diego Gas & Electric Company, San Diego, California, plans to spend an estimated $6,097,500 in 1958 on new gas facilities. Company's budget is second largest in history. Currently under construction are 42,000 ft of 20-in. high-pressure distribution line between Mission Valley and National City, at cost of $1,007,000, and 25,000 ft of 20-in. high-pressure main for distribution system improvement in San Diego, at cost of $750,000. Former job is contracted by Utility Construction Company, and the latter job is being built by Pacific Pipeline Construc-

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Digs flush when you need to — only the Model 210 Davis Backhoe has the ability to dig flush alongside walls, buildings, fences. Has 200° continuous operating arc.

A Davis Loader and Backhoe combination will put money in your pocket by outperforming any other rig — pound for pound, dollar for dollar.

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A 10-in. gas main is prepared for installation by divers across San Diego Bay from the San Diego sides to Coronado. This is one of a number of projects in San Diego Gas & Electric Company's 1957 gas service expansion program.

Rounding a corner, workmen weld lengths of pipe in Ohio Fuel Gas Company's $18,000 project to improve service to Upper Arlington, Ohio.

tion Company. Planned construction for 1958 includes 20,000 ft of 10-in. high-pressure distribution main between Rainbow transmission line and Clairemont area of San Diego, costing approximately $235,000, with company forces doing the work, and 26,000 ft of 8-in. high-pressure distribution line between Vista and Oceanside, estimated at $270,000, which will also be built by company forces. Other construction includes miscellaneous extensions and some replacements.

Cheyenne Light, Fuel, and Power Company, Cheyenne, Wyoming, has under construction two jobs, totaling 4305 ft of 2-in. low-pressure gas main in Cheyenne, at cost of approximately $4305. Company is doing own work. Jobs planned include 4145 ft of 4-in. intermediate pressure main. Company forces will also do this project.

Cambridge Gas Company, Cambridge, Massachusetts, plans to install 5000 ft of 12-in. high-pressure main in Cambridge and Somerville. First section of a new high-pressure supply main, this job is estimated to cost $160,000 and will be contracted. Work on new high-pressure supply main will be continued in 1959 and 1960, with total cost estimated at $700,000. Company also plans 1000 ft of 8-in. miscellaneous low-pressure main extensions and replacements in the two cities during 1958. Work will be contracted.

Philadelphia Gas Works, Division of U.G.I., Philadelphia, Pennsylvania, added 292,000 ft of 8-in. and smaller pipe in new mains and services on its low-pressure system in 1957, at cost of $1,514,000. PGW also installed 242,000 ft of 8-in. and smaller replacements in mains and services on its low-pressure system in 1957, at a cost of $1,931,000, along with 9300 ft of 36-

Newest addition to the Brooklyn Union Gas Company fleet on Staten Island is this 1957 model 5-ton truck. Driver is shown entering truck on left side. On right side of truck, ladder leads from running board to pulpit that contains folding seat and controls for operation of the crane from a position where operator has clear view of job being performed. **Truck statistics:** 164-hp, 406 cu in. engine; 232-in. wheelbase; full-length frame; 1000 x 20 12-ply dual tires on rear; radius-rod drive two-speed rear axle; Bendix hydro-vac booster brakes; equipped with heater, defroster, signal lights, tow hooks (front and rear) two rear-view mirrors, 5-amp low cut-in generator, 12-ton hydraulic jack, one spare tire. **Crane mounted on truck** is power-swing, power-topping truck crane of 10,000 lb capacity at 6-ft radius, equipped with three separate power reversing work gear winch units—one each for hoisting, boom swinging, and boom topping by power; boom swing accessories include automatic limit stops for extreme boom swing, maximum boom topping positions, and automatic work brakes for the hoisting and boom topping winch units, including a 12 to 18-ft telescopic boom adjustable to five lengths; a single speed heavy duty SAE power take-off complete with all mounting and driving parts; mounting angles; outriggers for crane base; cables; sheaves with weighted load block that has a drop-forged steel swivel hook.

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New Model 774 Wheel Ditcher for the big jobs up to 5'6" deep, 30" wide. Ideal for pipeline work. Exclusive Hydra-Crowd allows infinite range of digging speeds to 31 ft. per min. Unique flexible connection between chassis and wheel. Floating differential. All-hydraulic spoil conveyor. Hydraulic controls.

Model 705-B Runabout for scattered jobs up to 4' deep, 10½" wide. 15 m.p.h. road speed. Exclusive vertical boom digs right up to obstructions, leaves no ramp. Hydra-Crowd permits infinitely variable crowding speeds from 0 to 16 ft. per min. Fluid coupling prevents shock loads.

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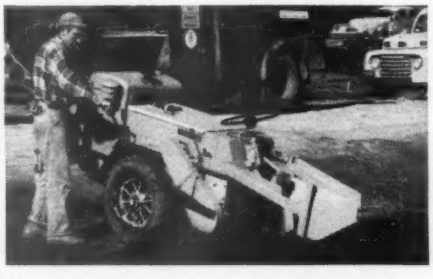
The first step in reducing ditching costs is to select the machine that meets your requirements. Ground conditions . . . digging range . . . travel speed between jobs—all are factors that change with varying trenching operations. That's why Barber-Greene builds *five* distinctively different ditchers, each with special features that give it unsurpassed performance in its field.

Model 711 for widely scattered jobs. 45 m.p.h. travel speed. Digs to 5' deep and 18" wide. One-man operation. Hydra-Crowd assures maximum crowding speed for every digging condition.



Model 702 for narrow trenches to 5" wide, 40" deep. Ideal for cable, conduit, or small pipe. Easily moved. Varidraulic drive gives finger-tip control of crowding speed from 0 to 20 ft. per min.

Model 44-C for heavy-duty trenching. It cuts to 8'3" deep, 24" wide. 15 digging speeds from 1 to 11 ft. per min., or available with Hydra-Crowd with infinitely variable speeds from 0 to 7 ft. per min.

Literature on request.

57-8-D

Barber-Greene BG

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CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

in. and smaller additions to its high-pressure main system, at a cost of $950,000. Nearing completion is installation of 20,500 ft of 20-in. and smaller high-pressure main at estimated cost of $615,000. For 1958, company plans 310,000 ft of 8-in. and smaller size additions in mains and services to its low-pressure system, at cost of $1,735,000, and 230,000 ft of 8-in. and smaller replacement mains and services in the low-pressure system, at cost of approximately $1,740,000. All work is done by company forces.

Southeastern Michigan Gas Company, Port Huron, Michigan, has completed work on three major projects, including 46,000 ft of 6-in. at Marine City, Michigan, costing $250,000; 7000 ft of 6-in. main in New Haven, Michigan, at cost of $32,000, and 14,000 ft of 6-in. at New Baltimore, Michigan, at cost of $72,000. All work was contracted by H. L. Gentry Construction Company.

The Berkshire Gas Company, Pittsfield, Massachusetts, has under construction 1500 ft of 3-in. main in Stockbridge, along with a secondary meter and regulating station. Berkshire Contractors is making the installation.

Portland Gas & Coke Company, Portland, Oregon, has completed work on a high-pressure gas supply line near Troutdale (suburb of east Portland) consisting of 33,344 ft of 10-in. and 12,033 ft of 8-in. New line will supply gas to Reynolds Aluminum's reducing plant at Fairview, and will also supply new Rockwood industrial tract being developed by the Union Pacific Railroad, as well as rapidly growing suburban areas. Contractor for job was Salem Sand & Gravel Company.

Southwestern Public Service Company, Amarillo, Texas, is currently constructing 2450 ft of 6-in. high-pressure main around Hooker, Oklahoma, at cost of $10,500. At Borger, Texas, company plans construction beginning in April, of 5500 ft of 2-in. and 342 ft of 4-in. main installation at cost of $6500, with company crews doing work. Work will also begin in April on 73,290 ft of 4-in. main relocation at Optima and Tyrone, Oklahoma.

West Ohio Gas Company, Lima, Ohio, proposes construction in 1958 of some 217,900 ft of new intermediate and low-pressure mains at an estimated cost of $546,000. New additions, extensions, etc., in the company's entire distribution system include 87,500 ft of 2-in., 15,250 ft of 3-in., 46,650 ft of 4-in., 16,500 ft of 6-in., and 4600 ft of 8-in.

3 feet of frost...
trench 5 feet deep...
30 inches per minute

CLEVELAND TRENCHERS, like Sunberg Well Company's Model 110 working here on the installation of 38,000 feet of 4-inch main in tough frost digging in DeSoto, Iowa, have *for over 25 years* delivered ***more trench . . . in more places . . . at less cost.***

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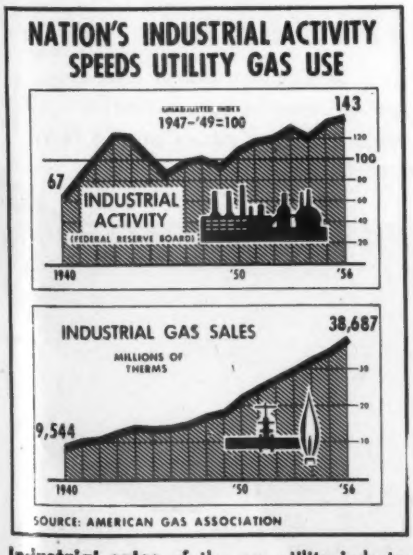
Government Scientist Honored. Distinguished Service Award for contributions to the gas industry was presented recently to John H. Eiseman (right), gas chemistry specialist of the National Bureau of Standards, by E. J. Funk Jr., chairman of the industrial equipment division of GAMA. Eiseman, called "an eminent government scientist in the field of combustion," was cited for a number of accomplishments including the first authoritative technical papers on the design of atmospheric burners.

Job Opportunities in the Gas Industry are described in the new AGA college graduate recruitment brochure, "Build Your Future in the Gas Industry." This brochure, produced jointly by the PAR Public Information and Personnel Committees, and now being distributed to selected college placement officers throughout the country, can easily be adapted for recruiting work by gas companies, either alone or augmenting their own publications. Back cover page is reserved for member companies to imprint their names and messages. Brochure tells an all-industry story and can be used for public information purposes such as distribution to public libraries, high schools, and opinion-forming groups. Copies are available for 25 cents each.



Industrial sales of the gas utility industry increased in 1956 three times faster than the nation's industrial activity. While the industrial activity index was rising 2.9 percent, industrial gas sales climbed 9.4 percent to 38,687 million therms.

IGT—Volume of Sponsored Research soared to a record high at the Institute of Gas Technology, affiliate of Illinois Institute of Technology, during the 1956-57 fiscal year. Sponsored research volume totaled $661,000—an increase of almost 20 percent over the preceding year, Dr. Martin A. Elliott, IGT director announced at the annual meeting of members and board of trustees. Year's activities were highlighted by the inauguration of a four-year undergraduate scholarship program, an increase in the volume of basic research, and the largest volume of sponsored research.

More Line Pipe. Electricweld line pipe is now being produced in standard sizes from 6⅝-in. OD to 12¾-in. OD, inclusive, by Jones & Laughlin Steel Corporation, Pittsburgh, at the company's previously announced $8,000,000 mill, to provide the gas industry with an additional tubular tonnage. The new mill lends itself to the manufacture of line pipe with light, uniform walls, resulting in considerable savings to the purchaser. Lengths up to 60 ft can be produced, reducing the number of field welds to a minimum. This pipe meets the requirements of the API standards, 5-L and 5-LX.

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Men At Work

IN THE GAS DISTRIBUTION INDUSTRY

● **William G. Wepfer** has been appointed national sales director for Arkla Air Conditioning Corporation. He is currently contacting gas utilities and other prospects for sales in all sections of the country, and directing a series of sales schools at the Arkla plant in Evansville, Indiana.

● **Ray O. Branam** has been appointed general manager in charge of engineering, production and sales for Midwestern Manufacturing Company of Tulsa.

R. O. Branam

C. A. Sweningsen

● **Charles A. Sweningsen** has been appointed manager of a newly activated construction department of Southern Counties Gas Company of California. Formerly a construction engineer, he has been with the California utility since 1947. Other department promotions are: **John McCollum** to supervisor, construction procedures, and **Frank Messersmith,** to supervisor, construction quality.

● **J. E. Stegelin** has been appointed sales engineer for Reynolds Gas Regulator Company to succeed H. D. Meuffels, deceased, in the Kansas City territory. Stegelin has 22 years experience in the natural gas and propane gas utility field as gas engineer for utilities on construction and operation of distribution systems and pipelines including the design and locating of the town border regulating and metering stations, district regulator stations, and the installation of the service regulators. In addition he has been the chief inspector on construction of distribution systems and pipelines and has supervised the conversion of distribution systems from propane air gas to natural gas.

● Arkansas Louisiana Gas Company has announced several promotions and transfers including: **J. Fred Gresham,** former manager at Hope, Arkansas, has transferred from administrative assistant, gas distribution department, to sales supervisor, distribution extension, gas supply and sales department, Arkansas Division. **C. W. "Cliff" Bridgers,** has been promoted to acting manager, gas distribution department, Hope, in addition to his present position as foreman, gas pipeline department. **H. T. "Pete" Commer,** has been promoted to chief clerk gas distribution department, Pine Bluff.

● **Winston E. Himsworth** has been elected secretary of The Brooklyn Union Gas Company. Formerly assistant vice president, he succeeds **Richard B. Loomis** who became president of South Brooklyn Savings Bank January 1.

● **Clifford A. Brandt,** closely identified with utility rate and regulatory matters for the past thirty years, has been appointed executive staff engineer of Houston Natural Gas Corporation. He was formerly assistant vice president of H. Zinder & Associates in Dallas.

● **William Manson** has been elected to the directorate of Inland Natural Gas Company, Ltd. Recently he retired from the Pacific region vice presidency of Canadian Pacific Railway.

● **Kenneth W. McPhee** has been appointed accounting supervisor of Lakeland Natural Gas Limited. He was formerly with the finance division of Ford Motor Company of Canada, Ltd.

● **Wilmot O. Smith** has been elected vice president in charge of gas and electric sales of Long Island Lighting Company. Also announced was the appointment of **Charles E. Elbert,** secretary, to the additional duties of assistant to the president.

● Recent personnel changes at Consumers Power Company of Jackson, Michigan, include: **John B. Simpson** has been elected vice president in charge of gas operations, succeeding **Donald E. Herringshaw,** resigned. **Alphonse H. Aymond, Jr.,** has been elected executive vice president in charge of legal, accounting, and gas matters. **Harold P. Graves,** former general attorney, succeeds him as general counsel. **Herman L. Fruechtenicht,** former general superintendent of Michigan Gas Storage Company, a subsidiary of Consumers, has become director of gas procurement and development. **Fred H. Bunnell,** former general supervisor of gas distribution, succeeds Simpson as general supervisor of gas operations. **Birum G. Campbell,** former division manager at Kalamazoo, has been elected vice president in charge of sales and business promotion.

● **Richard E. DuVall,** former superintendent of distribution, has been promoted to general superintendent of The Peoples Natural Gas Company. In his new position, DuVall will oversee operations of the company's seven divisions throughout Western Pennsylvania.

● **W. Wayne Hood** has been elected vice president in charge of sales for Leland Equipment Company of Tulsa. Hood is a veteran of 18 years in the construction machinery business, and several years in contracting. Also announced at the recent annual directors meeting was the re-election to their former positions of **W. R. Borgman,** president, **A. C. Beckner,** vice president, and **John E. Timberlake,** secretary-treasurer.

W. W. Hood

O. M. Jones

● **Owen Marshall Jones,** vice president, finance, and treasurer of Cascade Natural Gas Corporation, has assumed the duties of president. **C. Spencer Clark** has resigned as president and will resume his former duties as chairman of the board of directors.

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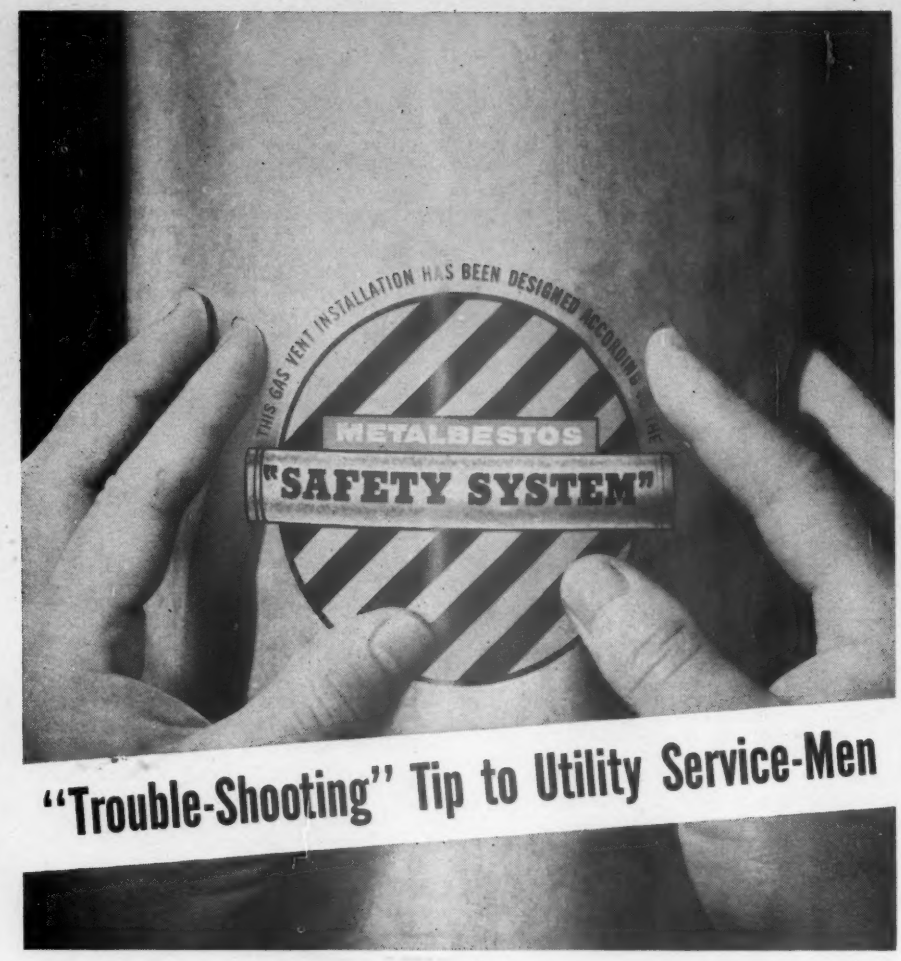

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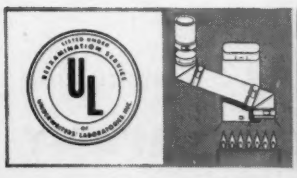
When a gas-vent installer places the red-and-black Metalbestos "Safety System" Seal above an appliance's draft hood, he's helping the service-man locate any future gas installation trouble . . . by telling him it's *not* in the gas vent. That's because the Safety Seal means an all-Metalbestos gas vent, designed and installed according to the Metalbestos "Safety System" Gas Vent Tables.

The Metalbestos "Safety Seal" stands for scientific, quality gas venting . . . free from unhealthy spillage at the draft hood and corrosive condensation within the vent. Learn to look for the Metalbestos "Safety Seal" and promote its use. It's good for your business . . . good for gas.

For complete information on the new Metalbestos "Safety System," write Dept. AA-12.



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Personals

● Two important top executive changes made recently by Wheelabrator Corporation of Mishawaka, Indiana, are: **Otto A. Pfaff,** chairman and president has retired as president and will continue as chairman of the board. **James F. Connaughton,** executive vice president, has been elected president.

● **T. D. Brissman** has been appointed manager of sales, Houston district office of National Tube Division. He succeeds the late James R. Boax.

● **Dale E. Frieden,** president of Zenith Gas System of Alva, Oklahoma, has been named president of the Oklahoma Utilities Association for 1958. **George F. Peck, Jr.,** Lone Star Gas Company, Pauls Valley, has been named second vice president of the association for the coming year.

D. E. Frieden

Dr. B. D. Thomas

● **Dr. B. D. Thomas,** scientist and research administrator, has been named to the presidency of Battelle Memorial Institute to succeed **Dr. Clyde Williams,** whose retirement as president was announced recently.

● **Seward Abbott,** previously with Servel, Inc., has been named to the Washington staff of the AGA. He will serve as utilization engineer, a new position in the Washington office, to provide information and advisory services for Federal departments and bureaus.

● **Charles C. Martin** has been appointed manager of advertising and sales promotion of Holly-General Company, a division of the Siegler Corporation.

● **Thompson Everingham** has been appointed advertising manager of Kerotest Manufacturing Company of Pittsburgh, Pennsylvania. He will handle all advertising for the Brass and Steel Division of the company.

● Two division gas utility managers have been appointed by Norge Division, Borg-Warner Corporation. **George S. Andrews** has been named western division manager responsible for sale of Norge gas home appliances to utilities in Kansas, Oklahoma, Texas, New Mexico, Arizona, and California. **Robert L. Brookman,** midwestern division manager, is in charge of gas home appliance sales to utilities in Ohio, Indiana, Illinois, Michigan, Missouri, Wisconsin, Minnesota, North Dakota, South Dakota, Wyoming and Montana.

● **J. Henry Long** has been appointed manager of the gas department of Philadelphia Electric Company succeeding **E. G. Boyer,** retired. Long will be responsible for gas production and distribution in suburban Philadelphia.

● **Pat H. Luckett,** sales manager of Rockwell Manufacturing Company, Instrument Division, Tulsa, has been promoted to assistant product manager-gas products for the Meter and Valve Division.

Personals

● **Richard A. Rosan** has been elected assistant vice president of the Columbia Gas System Service Corporation. He was also elected assistant counsel.

● **Dan R. Gannon** has been appointed general sales manager of Mueller Company.

D. R. Gannon

W. H. Hipsher

● **W. H. Hipsher,** executive vice president of Mueller Company, has been elected to the board of directors of the National Association of Manufacturers.

● **Norman E. Hathaway** has been elected director and vice president-marketing for Oronite Chemical Company. He will direct all marketing of Oronite chemical products through company sales offices in the U. S. and overseas.

● **William H. Oler** has been appointed sales manager, engineering division of Hauck Manufacturing Company, Brooklyn, New York.

● **Russell A. Sherer** has been elected vice president of White-Rodgers Company, St. Louis. He was previously sales manager, and will continue to direct all sales activities in addition to his new executive duties.

● **Henry E. Miller, Jr.,** has joined Hays Manufacturing Company as a salesman. His territory includes Missouri, Arkansas, Oklahoma, and Kansas.

● **Dresser Industries, Inc.** has announced six executive promotions: **R. E. Reimer** has been elevated to executive vice president and will continue to serve as Dresser's treasurer. **John Lawrence** has been named as executive vice president. **Thomas L. Moody** has been appointed vice president in charge of industrial relations. **J. Douglas Mayson** succeeded Reimer as secretary, and **Cecil C. Hill** and **Paul E. Brodrick** have been made assistant treasurers.

● **John C. McIntosh** has joined the staff of Cathodic Protection Service as sales manager of its newly formed Protective Coating Division. He will direct the company's full scale development program in the protective coatings field.

John Carroll Hamilton

J. C. Hamilton, 66, president of Arkansas Louisiana Gas Company and subsidiary companies, died December 19 at St. Mary's Hospital in Kansas City, Missouri, following an operation there in November. He was also president of Arkla Air Conditioning Corporation.

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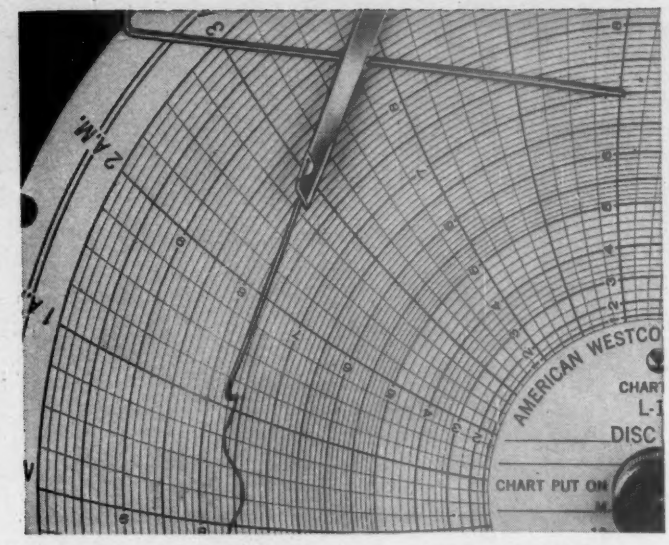

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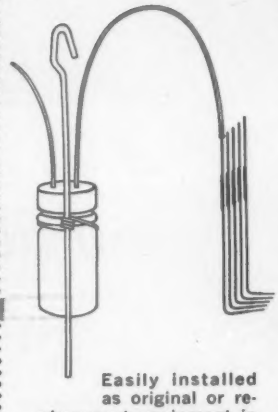

Easily installed as original or replacement equipment in all standard recording instruments. Available in five sizes and angles — special pens upon request.

Cannon controlled-flow capillary meter pens provide exceptional dependability and long life with minimum maintenance. Easy to install, these precision pens produce accurate chart records of maximum legibility and continuously record up to a full year without refilling reservoir.

- **Ends Unrecorded Intervals.** Unaffected by pulsating flows, chart speeds, rapid pen movement.
- **Sealed Ink Supply.** Prevents clogging from atmospheric contamination.
- **Two-Way Ink Flow.** Stainless steel writing point is positioned above ink level in reservoir and ink flows in either direction by capillary action—eliminates smearing, blurring.
- **Special Pens.** Designed and produced to customer specifications where special inking problems make standard pens impractical.

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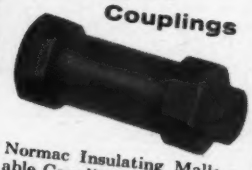
NORMAC
Insulating **Fittings**

Malleable Service Ell

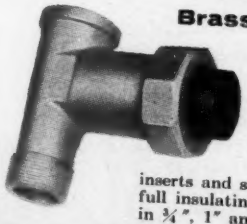
The insulating principle depicted above is carried out in all Normac Ells and Tees.

Malleable Couplings

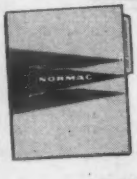


Normac Insulating Malleable Couplings and fittings are available with polyethylene inserts and semi-insulating gaskets or full insulating rubber gaskets.

Brass Fittings



Normac insulating Brass compression end Tees, Ells and all compression end fittings are available with polyethylene inserts and semi-insulating or full insulating rubber gaskets in ¾", 1" and 1¼" iron pipe sizes.



New CATALOG
Write for your copy . . . it gives complete details and specifications of NORMAC equipment.

NORTON-McMURRAY Manufacturing Co.
919 North Michigan Avenue

Couplings • Meter Bars • Sleeves • Cocks
Bell Joint Clamps • Service Tees and Ells

New Equipment

FOR THE GAS DISTRIBUTION INDUSTRY

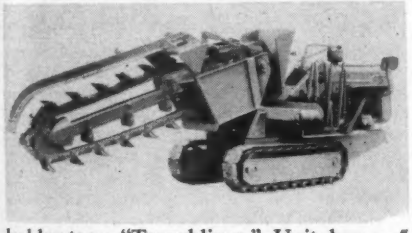
For more information on items described here in brief, use the handy reply card and circle the corresponding numbers

Pipe Cutting Accessory. New flexible shaft has been added to H & M Pipe Beveling Machine Company's line of accessory equipment. Fits any size in H & M's pipe

cutting and beveling machine line. Allows complete visibility of cutting or beveling operation. It is made from length of flexible tubing, with a crank handle attached to one end of the tubing and the other end attached to the crank pinion on the machine. *H & M Pipe Beveling Machine Company.*

CIRCLE (18) ON THE REPLY CARD

Trencher. Compact design incorporating features found on larger machines is one of the advantages listed for Parsons 77



ladder-type "Trenchliner." Unit has a 5 ft-10-in. roading and 5 ft-5-in. digging height, 4 ft width and total transporting weight of only 6750 lb. Digging range is to 5 ft depths at 6 to 18-in. widths. Introduced for the first time is a new self-cleaning bucket line. Four bucket line speeds range from 38.5 ft minimum to 246 ft per minute maximum. *Parsons Company.*

CIRCLE (19) ON THE REPLY CARD

Heating Control. New combination control for space heating has been introduced by the Grayson Controls Division of Robertshaw-Fulton Controls Company. Designated the Unitrol 1000, it combines A and B gas cocks, 100 percent safe-lighting automatic pilot, pilot filter, pilot flow adjuster, thermostatic gas valve, and pressure regulator in one small compact basic unit. Manual units either in the field or factory can be converted to automatic controls without use of special tools. Components that may be added to the basic unit include: A snap action, self-contained, hydraulic thermostat; a snap-off to by-pass hydraulic thermostat, a throttle to by-pass then snap-off hydraulic thermostat, throttle to a constant by-pass, and a 24-volt electrically operated gas valve. The basic unit can be used where only a gas cock and 100 percent automatic pilot are needed. A gas pressure regulator component can be factory assembled or field installed on any model of the Unitrol 100 control. *Grayson Controls Division, Robertshaw-Fulton Controls Company.*

CIRCLE (20) ON THE REPLY CARD

Map File Cabinet. Scott-Rice has recently announced a metal file cabinet with locking doors and fitted with 112 tubes on a

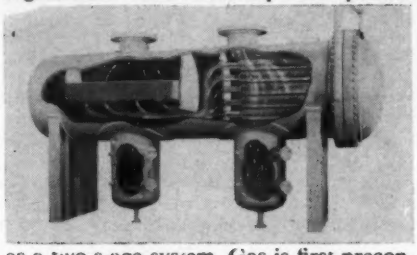
patented tilting base that is ideal for filing and locating rolled maps, drawings, blueprints and tracings. Unit accommodates filed items to 60 inches, all quickly located by a card file control. Colors available to match other office filing equipment or to match submitted color samples. Top shelf provides storage for indexing card file and other office supplies. *Scott-Rice Company.*

CIRCLE (21) ON THE REPLY CARD

Editorial Index Available

The Index to Volume 184 (January-December, 1957, inclusive) of American Gas Journal is now available. Subscribers desiring a copy of this index may obtain one by writing on their company letterhead to Circulation Director, American Gas Journal, P. O. Box 1589, Dallas 21, Texas.

Gas Filter-Separator. Perry Equipment Corporation has announced a new filtering unit that is designed to separate liquids from gas streams containing finely-divided fog or mist. Peco Filter-Sep unit operates



as a two-stage system. Gas is first preconditioned by coalescing liquid particles present into larger droplets that are not able to "float" in the gas stream. These enlarged droplets are then removed by means of a wire mesh-type mist eliminator section located in the Filter-Sep unit. Unit will remove airsols and fogs from gases, as well as filter out traces of foreign solid matter that may also be present. Typical applications involve removal of traces of compressor oil from compressed gases, and preconditioning of gas streams prior to further processing such as dehydration or liquefaction. *Perry Equipment Corporation.*

CIRCLE (22) ON THE REPLY CARD

Screwdriver with Built-in Flashlight. New precision made tool of chrome finished

CIRCLE (23) ON THE REPLY CARD

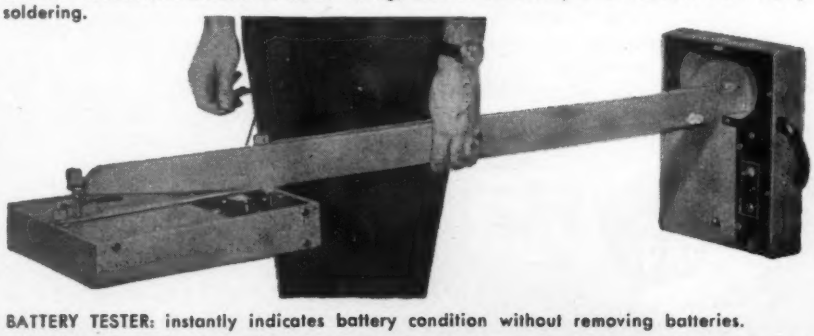
steel gives light where you need it. Is ideal for hidden work areas. Complete with leatherette case; includes 4 interchangeable bits, 2 Phillip's head screwdrivers, removable chuck. Flashlight unit usable with or without tools attached. Uses standard flashlight cells. *Silver Bells Limited.*

The WILKINSON LINE LOCATOR

PREVENTS COSTLY DAMAGE

Spots all sub surface pipes, cables, etc., and determines their depth accurately.

ETCHED CIRCUITRY: instead of hand wiring, insures uniformity and freedom from faulty soldering.



BATTERY TESTER: instantly indicates battery condition without removing batteries.

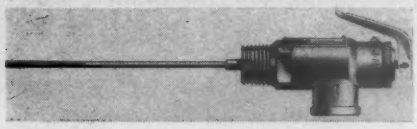
INSTRUMENT CASE: Made of tough, wear resisting phenolic material. The antennas are an integral part of cases, moisture and shock proof.

WILKINSON PRODUCTS COMPANY

3987 Chevy Chase Drive. PASADENA 3, CALIFORNIA. SYlvan 0-4314

New Equipment

Relief Valves. Watts Regulator Company has announced a new series of low-cost self-closing temperature and pressure re-



lief valves called the Watts-O-matic 444 series. Models with or without a test lever and short or extension type thermostat with an AGA water temperature rating of 200,000 Btu/hr are included in the series. They are designed to provide fully automatic temperature and pressure relief protection to applications where similar but semi-automatic (fuse plug type) valves were previously used. *Watts Regulator Company.*

CIRCLE (24) ON THE REPLY CARD

Light-weight Aluminum Buildings. Easy to assemble, completely fabricated and ready for bolting together, new aluminum units can be used to construct shelters for large meter settings, district regulators, vehicle shelters, etc. Sizes up to 10 by 20 by 8 ft high are available. Units need no painting, are furnished complete with all bolts and screws for assembly. *J. B. Sebrell Corporation.*

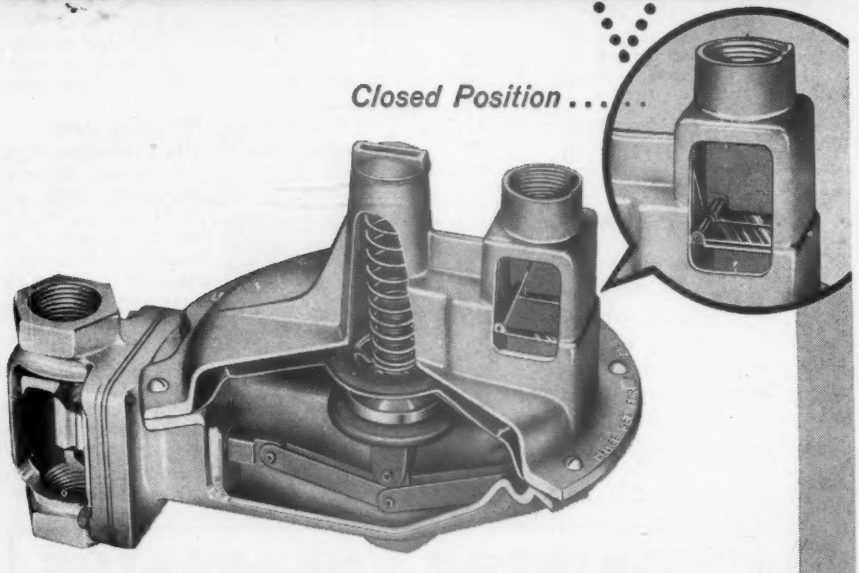
CIRCLE (25) ON THE REPLY CARD

Direct-Vent Gas Wall Heater. Provides safe, low cost zone heating ideal for use in motels, garages, offices, etc. Heater requires no chimney as it vents directly through any outside wall. Uses outside air for combustion and exhausts products of combustion through a sealed porcelain combustion chamber to the outside. *Heil-Quaker Corporation.*

CIRCLE (26) ON THE REPLY CARD

REYNOLDS trouble-free and accurate

INTERNAL RELIEF VALVE



This new Reynolds relief valve has a double action sealing effect which permits the use of a large relief valve orifice which still seals and relieves within close regulation.

An Automatic quick opening flapper for excess pressure gas and yet has standard small vent opening for normal regulation.

The all stainless steel construction flapper valve eliminates high shock-lock off common to other type regulators.

Also available on NRT8010 series No. 1 Model 10, No. 1 Model 20, and No. 1 Model 30 series.

GAS CONTROL SINCE 1892

Not Shown—A Complete Line of Outside Vent Protection

Write for detailed information

REYNOLDS GAS REGULATOR CO.

ANDERSON, INDIANA

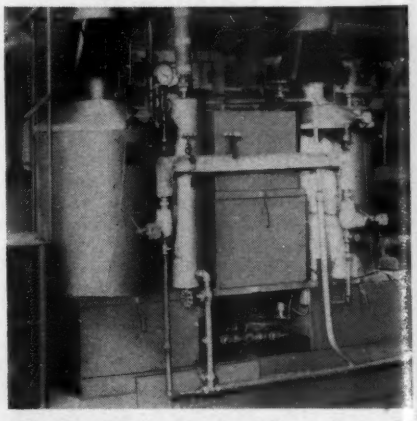
Combustible Gas Analyzer. Mine Safety Appliances Company's new model F gas analyzer is designed to provide flexible, centralized instrumentation for process control and industrial safety by continuous or intermittent sampling and measurement of combustible gases and vapors in mixtures with air at normal or high temperatures. Any of three basic systems can be provided by means of flexible arrangements of five subassemblies or units. These systems provide continuous tube sampling of up to six individual stations; continuous remote heat sampling of as many as six individual stations; or intermittent tube sampling of a maximum of eight stations. *Mine Safety Appliances Company.*

CIRCLE (27) ON THE REPLY CARD

Water Heaters. Temco has introduced a new line of gas water heaters consisting of 20, 30, and 40 gal models in a "Tall-Boy" series and 20, 30, 40, and 55 gal models in the "Shorty" series. Both lines are available in models carrying 1, 5, and 10-year warranties. The 1- and 5-year models have super-strong, solid steel seamless tanks. Heavy zinc plating is alloyed to steel to become a deep seated part of the metal. The 10-year warranty models have tanks with "Ceramiclad" glass lining that makes the tank impervious to rust, scale, and corrosion. Added feature of these models is a magnesium anode rod. All Temco water heaters feature a perimeter burner, triple jet pilot, radiant shield, fiberglass insulation, steel draft diverter hood, steel flue baffle, drain valve, and 100 percent automatic controls as standard equipment. *Temco, Inc.*

CIRCLE (28) ON THE REPLY CARD

Steam Generators. Gas-fired, flash type, continuous coil constructed generators are capable of producing live steam in 2 to 3



minutes. Made in sizes from 3 to 30 boiler horsepower. Each generator is a complete package, compact enough to be installed wherever steam is needed. No special foundations, walled in areas, or special insulation required for installation. Connects simply steam generator to water, fuel, and electricity. Flash type continuous coil produces quick steam without a boiler, so no licensed operator is required. Burner operates only when steam is needed. *Malsbary Manufacturing Company.*

CIRCLE (29) ON THE REPLY CARD

FAST, LOW-COST WAY TO INSTALL PIPE . . .

push it under streets, roads, tracks, lawns with a timesaving

GREENLEE HYDRAULIC PUSHER

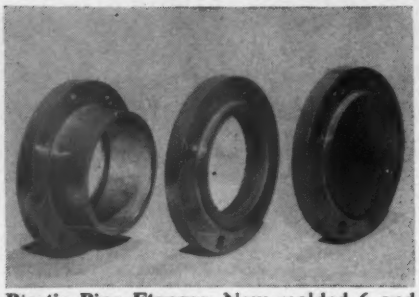
Speed underground piping jobs this way. GREENLEE Pusher is one-man-operated (by hand or with power pump), portable, simple to set up and use. No tearing up of pavement, floors, lawns . . . does away with extensive ditching, tunneling, backfilling, repaving. GREENLEE Pusher cuts job time to a fraction . . . often pays for itself on first job.

Two feet per minute average pushing time

GREENLEE Pushers are available in two sizes: No. 790 for ¾" to 4" pipe . . . No. 795 for pipe over 4", concrete sewer pipe, large ducts. Average performance of No. 790, shown above with power pump, two feet per minute. Write for literature.

GREENLEE

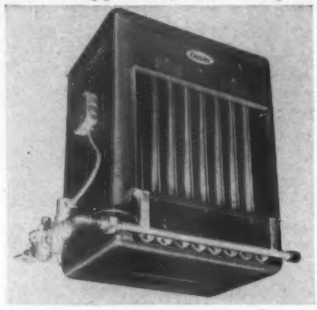
GREENLEE TOOL CO.
2422 Columbia Avenue • Rockford, Illinois



Plastic Pipe Flanges. New molded 6 and 8-in. PVC pipe flanges are now in production by Luzerne Rubber Company for use in PVC and other plastic pipe installations. Threaded, socket, blind and reducing flanges are available in both 6 and 8-in. sizes of normal impact or high impact types. *The Luzerne Rubber Company.*

CIRCLE (30) ON THE REPLY CARD

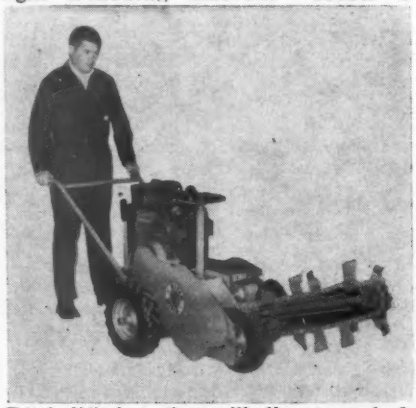
Duct Furnace. Carrier has introduced a new gas-fired duct furnace that features simpler installation in less space. Furnaces are AGA approved, and adaptable for



heating in conjunction with air conditioning installations in stores, supermarkets, restaurants, and other low ceiling structures. May be used in existing duct work to inexpensively add heat to an air conditioning system or an undersized forced air heating plant. Furnaces are available with an open or encased blower assembly proving flexibility in laying out forced air systems of any capacity. Eight sizes with outputs ranging from 50,000 to 230,000 Btu are available. *Carrier Corporation.*

CIRCLE (31) ON THE REPLY CARD

Self-propelled Trencher. Charles Machine Works has announced a new self-propelled light trenching machine — Model C



Ditch Witch — that will dig a trench 3, 4½, or 6-in. wide to depths up to 2 ft at about 4 ft per minute. Unit is powered by a 7 hp air cooled gasoline engine. Completely mobile under its own power, trencher is easily hauled on the job by one man. Is small enough (34 inches wide) to go through standard width gate for work inside fenced yards. *The Charles Machine Works, Inc.*

CIRCLE (32) ON THE REPLY CARD

New TAPPING TEE FOR GAS MAINS by Nibco

PART NO. 4911 - GS
Made from Schedule 40 ASTM A-106 A or B carbon steel

- WELDS TO MAIN AND 1-1/4" SUPPLY LINE
- COLD-FORMED FROM SEAMLESS STEEL TUBE
- EXTRA STRONG, EXTRA SMOOTH INSIDE AND OUT
- COMPLETE WITH PLUG AND CAP

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Bulletin Board

NEW BOOKS...BROCHURES...CATALOGS

For more information on items described here in brief, use the handy reply card and circle the corresponding numbers

Service Manual. Latest printing of General Controls B-60 Service Manual is now available for the installer and serviceman of heating and air conditioning equipment and controls. Seventh edition covers installation, maintenance, and service of the

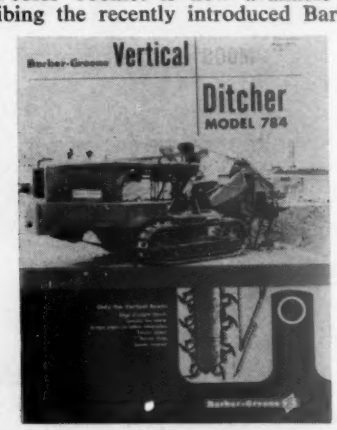
B-60 self-powered gas system, thermostats, pilot generators, fan and limit controls, transformer relays, thermopilot valves and a guide for use of millivolt meters. *General Controls Company.*

CIRCLE (73) ON THE REPLY CARD

Pipeline Filters. New four-page two color bulletin describes some of the various filters manufactured by Dollinger for air and other gases. Specifications, cut-away illustrations, and photographs graphically point out features of models. Staynew Pipe Line Filters' double action principle, applications, and advantages such as simplicity, accessibility, long life, and efficient operation are outlined in the bulletin. *Dollinger Corporation.*

CIRCLE (74) ON THE REPLY CARD

Vertical Boom Ditcher. New 16-page, two-color booklet is now available describing the recently introduced Barber-



Greene model 784 crawler mounted ditcher. Among machine features described and illustrated by photographs and drawings are: Dual range "Hydra-Crowd," all hydraulic crowding transmission; unique, flexible draw-bar system that reduces strain and twist on the digging boom when machine is digging on uneven ground or traversing a curve; new type bucket line drive that eliminates long wrap-around and equalizes contact to each side of boom, and hydraulically operated spoil conveyor. Center spread in the folder shows oversize photograph of the ditcher with all salient details recapitulated and identified as to their location on the machine. *Barber-Greene Company.*

CIRCLE (75) ON THE REPLY CARD

Wrought Iron Pipe Installations. New booklet entitled "Wrought Iron O. D. Piping," documents more than a score of typical commercial and industrial wrought iron pipe installations. Case histories show wrought iron durability under a wide variety of operating conditions. ASTM specifications under which Byers pipe is manufactured are included in the 8-page booklet as well as photo-micrographs showing the physical structure of the material. *A. M. Byers Company.*

CIRCLE (76) ON THE REPLY CARD

Crawler Tractor. Pocket-sized line catalog has been revised to include Allis-Chalmers' turbo-charged HD-21 diesel powered crawler tractor and new TS-160 motor scraper. Each unit in the line is pictured in the booklet and information about size, capacity, weight, horsepower, and other pertinent facts are given. *Allis-Chalmers Manufacturing Company.*

CIRCLE (77) ON THE REPLY CARD

BOOKSHELF

Buildings for Industry, *by editors of ARCHITECTURAL RECORD, published by F. W. Dodge Corporation, 119 West 40th Street, New York 18, New York. Pages, 390. Price, $9.75.*

Study of new contemporary industrial architecture and its problems details 74 industrial projects that have been able to meet seemingly contradictory challenges of modern business. This section is organized into six categories: Warehouses, light industry, utilities and service industries, consumer goods, manufacturing laboratories, and heavy industry. The preface by Emerson Goblem, managing editor of Architectural Record magazine, covers the growing role of the architect in industrial buildings. Also included is a collection of chapters presenting typical problems in industrial building design and giving proved solutions developed by some of the world's top architects and engineers. Subjects covered are materials handling, air conditioning, color, feeding employee facilities and circulation, electrical systems, and lighting.

Reporting Financial Data to Top Management, *published by the American Management Association, Inc., 1515 Broadway Times Square, New York 36, New York. Pages, 192. Price, $5.25.*

Because of the growing complexity of business, new reporting techniques are required to make financial information meaningful to top management. These new techniques are described in the AMA special report. Financial executives of leading companies discuss how to organize and administer effective financial reporting programs. Publication also includes detailed description of A. O. Smith Corporation's successful financial reporting system, and a presentation of a system of variance analysis for operating-control reports.

Welded Steelcase Meters. Three new bulletins are now available from American Meter Company giving technical informa-

tion on the entire line of welded steelcase meters. Bulletin 304 covers meters with capacities of 75 to 300 cfh, rated with 0.64 sp gr gas at ½-in. pressure drop and 5 psi rated work pressure; bulletin 303 covers the W-75 meter which has a rated capacity of 75 cfh, and bulletin 302 describes the new W-45 LPG meter with a rated capacity of 45 cfh propane. *American Meter Company.*

CIRCLE (78) ON THE REPLY CARD

Weatherproof Meter Houses. New catalog gives specifications and construction features on complete line of houses including the Moran standard, multi-door, horizontal, portable walk-in, utility, indicating, or recording types, as well as their vertical plant, custom built and cycling meter houses. Catalog is illustrated with photographs and diagrams, and gives details on installation. Meter houses are designed to effect instrument protection from all weather hazards, to insure against plant shutdown, excessive maintenance costs, and instrument freeze-up under severe weather conditions. *Moran Furnace and Sheet Metal Company.*

CIRCLE (79) ON THE REPLY CARD

Dehydrators. New bulletin describes Selas dehydrators that are designed to remove moisture from most gases. Moisture removal and discharge from the system is continuous, with no flow interruption or interference. Gas inlet pressures may range from a few pounds gage to 150 psig for standard design with up to 3500 or more psig for special applications. Outlet dew-point (moisture level) is maintained safely below the specified level, which can run to −100 F. *Selas Corporation of America.*

CIRCLE (80) ON THE REPLY CARD

All-Wheel-Drive Trucks. Eight-page, full-color catalog describes six heavy-duty International all-wheel-drive truck models of cab-forward design. Included are the four-wheel-drive models AC-170 (4×4) and AC-180 (4×4) with GVW ratings of 18,000 and 20,000 lb respectively, and four six-wheel-drive models in the ACF-170 (6×6) and ACF-180 (6×6) series with GVW ratings from 22,000 to 33,000 lb. All units are available with either gasoline or LPG engines. *International Harvester Company.*

CIRCLE (81) ON THE REPLY CARD

How remote control dispatching by Texas Gas Transmission Corp. delivers GAS to American Louisiana Pipeline Co.

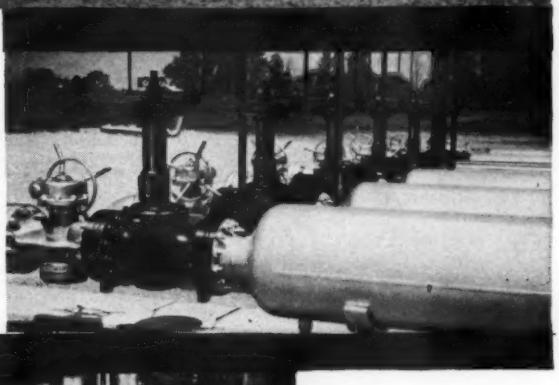
At Texas Gas Transmission Corporation's measurement station near Slaughters, Kentucky, need for attending personnel is eliminated by use of American® Telemetering equipment, Remote-Set Flow Controllers, Pressure and Differential Transmitters, Reliance Motor Valves and American-Westcott Orifice Meters.

Personnel at the compressor station office, located one-half mile from the measurement station, dispatch gas to the American Louisiana Pipeline Company entirely by remote control from Telemetering data.

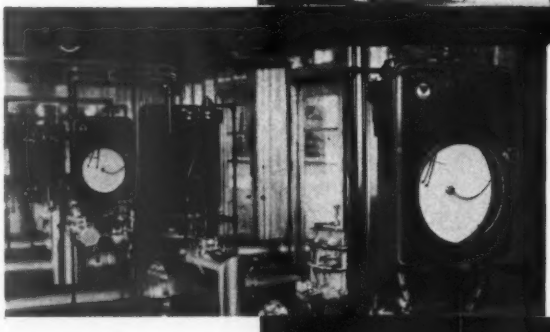
The station is supplied from two parallel 26-inch lines and consists of six 8-inch orifice meter runs between two 26-inch headers. Optimum operating range of the station is 10,000 Mcf per day to 150,000 Mcf per day, with a maximum of 480,000 Mcf per day at 800 psig, should it be required.

This model station is another example of American's precision made, dependable equipment for gas measurement, regulation and control from well-head to burner-tip.

For measurement engineering assistance in your remote control and measurement problems, consult your American Meter representative.



Six Reliance Type CBVA Motor Valves, equipped with valve positioners, control flow — are operated by American Series A-88 Remote-Set Flow Controllers.



Six 8-inch orifice meter runs, equipped with American-Westcott Orifice Meters, accurately measure flows of 10,000 Mcf to 150,000 Mcf per day.

Two-way switches and American Recording Differential and Pressure Receivers, in compressor station office one-half mile away, enable remote setting of flow controllers by station personnel.

AMERICAN® METER COMPANY
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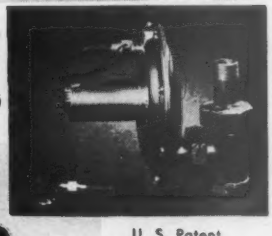

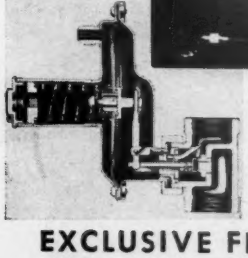

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